| | OCEDURE SO 6.0 E CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|--|--|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE IN UNIT 1 | |
| (7.2) Tendon No.: <u>H46-39</u> Tendon End: <u>Buttyess</u> Description Descripti Description Descri | Field |
| Grease Cap Removal | |
| (7.5)Date Removal Started: $10 - 20 - 2010$ (7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes X No(7.7) Temp. of Concrete: 67 °FThermometer No.: $5T$ 82Re-Cal Date: $6-23-11$ | Q.C. Signoff |
| Ambient Temp.: <u>68 °F</u> Thermometer No.: <u>PK 102</u> Re-Cal Date: <u>2-9-11</u> (8.4) Anchorhead I.D. : <u>EX4W41/AB7W</u> 7 Anchorhead Verification: <u>R</u> Match \Box No-Match | <u>189-10-20-10</u> MCC 10-20-10 |
| (8.5) Grease Coaling Grease Cap - Complete / Partial Uncoated % Buttonheads - Complete / Partial Uncoated % Anchorhead - Complete / Partial Uncoated % Shims - Complete / Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete / Partial Uncoated % ⁽¹⁾ - Limited within the Inside diameter of the grease cap. | UPP 10-20-10 |
| 8.7) Grease Color Match: INO Grease Color: Med. Browd Comments: No. Grease Color: Med. Browd | WER 10-20-10 |
| 8.8) Quantily of Samples Quart Samples Identifiad per Step 8.8.1? Q Yes INO Location of QA.H. B.P. Q Shims Cap Duct Removal | WP210-20-10 |
| 8.9) Qly. of Grease lost during removal of cap: 8.9.1) Grease from cap to be reused? ⊠ Yes □ No | WRC 10-20-10 WRC 10-20-10 WRC 10-20-10 WRC 10-20-10 |
| 10.3) Method of Tendon Protection: | WPP 10-21-10 |
| 10.5) Total quantity of lost grease (below): (8.8) <u>5</u> + (8.9) <u>0</u> + (8.9.1) <u>25</u> + (9.6) <u>25</u> + (10.4) <u>0</u> = <u>1.6</u> TOTAL 11.12) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. Ø Yes No | WRRID-21-10 WRRID-21-10 WRRID-21-10 |
| CReviewed: Jomen C- Other Level: IF Date: 10 | 5-27-20 |
| | 6.0 TM.09 ISI doc pical Report 204 Revion tachment 8.7 Page 29 of |

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| | C PROCEDURE SQ 6 REASE CAP REMOVA Data Sheet 6 July 31, 200 Page1 of Revision |
|---|--|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | an a |
| (7.2) Tendon No.: <u>H46-39</u> Tendon End: <u>Butt. 4</u> Sho | p 🛛 Field |
| Grease Cap Removal | an ta sun a cha da an da an ta sun an ta La sun a ta s |
| (7.5) Date Removal Started: $10 - 20 - 10$ (7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes \Box -No(7.7) Temp. of Concrete: 62 °FThermometer No.: $5f - 83$ Re-Cal Date: $6-23 - 11$ Amblent Temp.: 62 °FThermometer No.: $9k - 103$ Re-Cal Date: $6-23 - 11$ (8.4) Anchorhead I.D.: $F Y 9 8 9$ Anchorhead Verification: \Box MatchNo-Match | Q.C. Signor 768 10-20-1 |
| | 11. 10-20-10 |
| (8.5) Grease Coaling Grease Cap - Complete Partial Uncoated % Buttonheads - Complete Partial Uncoated % Anchorhead - Complete Partial Uncoated % Shims - Complete Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete Partial Uncoated % (¹⁾ - Limited within the inside diameter of the grease cap. V V V | 7.11.1 JD-20.1 |
| D.6) Unusual Conditions: None | 76.4.10-20-1 |
| (8.7) Grease Color Match: Ares INo Grease Color: <u>Brown</u> Comments: <u>None</u> | 203.10-20-16 |
| 8.8) Quantily of Samples 2 Quart Samples identified per Step 8.8.1? | 7.69.10.20-). |
| 9.6) Qty. of Grease removed from anchorage:gal. 9.7) Damage during cap removal or anchorage cleaning?Yes ArNo Describe: //A | gal. 210. 10-20-10 gal. 718. 10-20-10 7.12-10-20-10 7.12-10-20-10 |
| 10.3) Method of Tendon Protection: <u>Tostall can with Plastic 10-20-204</u> 10.4) Amount of Grease Loss from Tendon duct: <u>O</u> gal. | 7.62.10-21-10 7.63.10-20-10 |
| 10.5) Total quantity of lost grease (below): (8.8) <u>-5</u> + (8.9) <u>0</u> + (8.9.1) <u>0</u> + (9.6) <u>1</u> + (10.4) <u>0</u> = <u>1.5</u> TOTAL 11.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. XYes ПNO | 7.63.10-20-10 7.63.10-20-10 |
| CReviewed: W Cauce Volge Level: IF Date: | 10-27-10 |

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15 SQ 6.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 30 of 523

| Pro | oject: TMI 35 TH YEAR | TENDON SURVEIL | LANCE | | | | | |
|-----------|--|---------------------|-------------------------------|-----------|----------------------------|-----------------------|----------------------|----------------|
| (8 | .1) Tendon No.: <u>H 4</u> | <u>5.39</u> | Tendon I | End: But | 11536 | Shop 🛛 | 0 F | ield |
| (9. | 5.1) DURING REMOVA Water Detected: Moisture Description: Comments: | Yes X No | Quantity: | | Sample Tal ant Moislure | 5 A | 3 门 No Applicable | |
| (9.6 | 5.1) INSIDE GREASE C Water Detected: Moisture Description: Comments: | Yes No | Quantiliy: <i>L</i> isture | | Sample Tal ant Moisture | | Applicable | X î N/A |
| (9.7) | 7:1) AROUND TENDON Water Detected: Moisture Description: Comments: | Ves No | Quantity: | ······ | Sample Tal ant Moisture | ten: □,Yes [X] Not | Applicable |) N/A |
| (9.9 |), 1) DURING DETENSIO Water Detected: Moisture Description: Comments: | ÷ 1 | سطيب | Significa | Sample Tak ant Móisture | - | No. | ⊠`N/A |
| (11 | 1) NOTIFICATION Exelon Notifie | N /A d: □Yes □No | | | | | Date: | |
| SAI | MPLE IDENTIFICATION (12.2) Samples adeg (12.3) Sa | | 1/8 | | | | | |

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| | RS5 | | | Ĵu F | |
|---------|---|---------------------------------------|---|--|----------------|
| P | Project: TMI 35 TH YEAR | TENDON SURVEILLANCE | | | |
| | 8.1) Tendon No.: <u> </u> | 76-39 Tendor | End: Butt. 4 | Shop 🛛 | Field |
| (9 | Moisture Description: | L OF GREASE CAP | | | €] N/A |
| (9 | | · · · · · · · · · · · · · · · · · · · | | х. | |
| (9) | Water Detected: Moisture Description: | ANCHORAGE COMPONENTS | | ☐ Yes ☐ No Schot Applicable | |
| (9 | 9.1) DURING DETENSIO Water Detected: Moisture Description: Comments: | | ∂ Sample Taken: ☐ Significant Moisture | Yes No Mot Applicable | ₩ |
| (Ť | 1.1) NOTIFICATION Exelon Notifie | d: 🔲 Yes 🛄 No Individua | | Date: | |
| SA | • | AND STORAGE | MA | | |
| | QC Signoff: | C. Entre Ponce Poble | Level: TL | Date: <u>10-2.0-</u> Date: <u>10-2.7-</u> | |

¹⁶ B03ctaIIRtep9 IS204 Revion 0 Attachment 8.7 Page 32 of 523

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| | Page 1 c | f 1 | | | |
|---|-------------------------|--|--|-----------------|------------|
| Station: TMI Unit: | Date: 10 - 2 | 20-2010 | Report No: | | |
| WO No(s): R2139507 | Tendon Anchora | ge No.: H46-39 | Tendon End: 🔀 | Shop 🗌 Field | d |
| Location: Tunnel, Gallery, Buttres | | Elevation: 389'6 | | Dillashle to 1 | acet |
| Bearing Plate I.D. | Anchor Head I.D. EXA | 1W4 B | ushing I.D. 487 | | <u></u> |
| | | | | Remote | |
| X As Found Exam | As Left Exam Followin | چىنىيەت مىلىدىن تىرىمىيە تەركى بىلەرلىك بىلەرلىك بىلىكە ئىرىمىك تارىخ بىلىك تىرىمىك تىرىمىك تىرىمىيە تارىخ | dons Which Have | Been Detentione | ed |
| Design Drawing(s) TMI 1 - 0015 M&TE Used Steel Sale R-21 6-24-11 | Visual A | ids: Nowe Serial No. N/A | Cal. Due | Date ALA | |
| Illumination Used Flashlight | | | 10-20-10 | Time: 12:30 | 5 |
| Special / Specific Instructions: | | | | | |
| Component / Item Number and | RESULTS | | Explanation / Note | | |
| Description | | | e Attached Depictir Protruding, Unsea | | .11 |
| H46-39 steel Anchomy components. | ev | NO indica | tions | | |
| Results Legend: NI - No In | dications RI - Recordal | le Indication IO – Inform | nation Only | | |
| | Recordable Indica | | | | |
| A. Missing Wires B. Missing Button Heads | | acks | 0. | Other (Expla | in) |
| C. Protruding / Unseated Wires | | cks, Gouges, Mechanical | Damage | | |
| D. Broken Wires | K. U | neven Shim Stack | - | | |
| E. Active Corrosion F. Other Corrosion | | cessive Shim Gaps asket Seating Surface Da | mage | | |
| G. Evidence Of Free Water (Quanti | i fy) N. S i | urface Discontinuities, De | | | |
| Supplemental Information : XYes | | | her (Describe): | | |
| | Results: Acceptable | Yes No | | | |
| EXAMINER/EVALUATOR (Print & Sign) W. RINCE RODDINS |). Some lot | LEVEL | TT D | ATE 10-202 | 'AIÈ |
| STATION/ADMIN REVIEW | · ~ 1 / | | | . 1 | |
| (Print & Sign) | ian Johnsin 1 | \sim | DATE 10 | 0/29/2010 | b , |
| This section to be comple | | Evaluator notes RI | or Unacceptable | e condition. | |
| RI or Unacceptable results Accept | otable 🗌 Yes 🗌 N | lo | | | |
| Additional Actions: | | | | | |
| (Action Request, Work Order, Issue Report, e | | n) | | | |
| LEVEL III or RI REVIEW (as applica | ble) | | DATE: | | |
| ANII REVIEW (as applicable) | asing theby | | DATE: // | -4-10 | , |
| V | Page of |) | | | |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| | ı ay | | |
|---|--------------------------|--|---|
| Station: TMI Unit: 1 | Date: | 10-20-10 | Report No: 1/4 |
| WO NO(S) R 2139507 | | chorage No.: H 46-3 | 9 Tendon End: Shop Field |
| Location: Tunnel, Gallery, Buttress | 54 | Elevation:389' | |
| | Anchor Head I.D. | and the second | Bushing I.D. */A |
| Exam Type: DV XVT-1 | | | Of Exam: Direct Remote |
| As Found Exam Tras 1 0010 | | | Tendons Which Have Been Detentioned |
| Design Drawing(s)TMI 1-0016 | Vis | ual Aids: None C or Serial No. 1/A | Col Due Date MIA |
| M&TE Used: stee Rule R-22 6-25-11 P | | C or Serial No. 1/1 mination Verified: D | Cal. Due Date: 4//2 ate: 10-20-10 Time: 12:30 PM |
| | ·/4- | | ale 10-20-16 mile. 12:30 pm |
| Component / Item Number and | RESULTS | 6 | Explanation / Notes |
| Description | NI RI TYPE | IO (Sketch Sh | all Be Attached Depicting Location Of All ing, Protruding, Unseated Wires) |
| Tendon Anchorag on | / | No ind | ications. |
| H46.39 Butf. 4/field | | Reference | Enclousure 6 Data sheet. Y. |
| Results Legend: NI - No Ind | ications RIRe | cordable Indication IO - I | Information Only |
| | | Indication Type Codes: | |
| A. Missing Wires | н | | O. Other (Explain) |
| B. Missing Button Heads C. Protruding / Unseated Wires | .ا ان | Pitting Nicks, Gouges, Mecha | anical Damage |
| D. Broken Wires | ĸ | Uneven Shim Stack | - |
| E. Active Corrosion F. Other Corrosion | L | | |
| G. Evidence Of Free Water (Quantify | | | |
| Supplemental Information : XYes | | APhoto Video | Other (Describe): |
| | Results: Accep | table 🛛 Yes 🗌 N | 0 |
| (Print & Sign) Trothy (Children Lung | 1 C. Other | IF | VEL TE DATE 10-20-10 |
| STATION/ADMIN REVIEW | | 0 | |
| (Print & Sign) | | <u>~</u> | DATE 10/29/2010 |
| - | - | | s RI or Unacceptable condition. |
| RI or Unacceptable results Accept | able 🗌 Yes | 🗌 No | |
| Additional Actions: | initiated for Correction | Action) | |
| (Action Request, Work Order, Issue Report, etc LEVEL III or RI REVIEW (as applicab | | | DATE: |
| / | 2,11 | h the | DATE: /1-4-16 |
| ANII REVIEW (as applicable) | Taseel A.J | avy | DATE: //~4~/0 |
| \mathcal{V} | Page | L of L | |

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| ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage | | | | | | | | |
|--|-----------------------------------|--|---|--|--|--|--|--|
| Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1 | | | | | | | | |
| Station: TMI Unit: 1 | | LI-2010 Report No: | | | | | | |
| WO NO(S): R2139507 | Tendon Anchorage | |] Field | | | | | |
| Location: Tunnel, Gallery Buttress: | | Elevation: 389'L (' Bearing Plate I.D. Uwbl | 2-to loca | | | | | |
| | Anchor Head I.D. EX4 V | V4 Bushing I.D. AB7W7 | | | | | | |
| Exam Type: DV XVT-1 | As Left Exam Following F | Type Of Exam: Direct Remote Retensioning Of Tendons Which Have Been Dete | ntioned | | | | | |
| Design Drawing(s) TMI 1-0015 | Visual Aids | | nuoneu | | | | | |
| M&TE Used Steel Scale R.21 6-24-11 | Test Card UTC or Ser | rial No. N/A Cal. Due Date: N/X | and the second se | | | | | |
| Illumination Used Flashlight Special / Specific Instructions: | Illumination | NVerified: Date: 10-21-2010 Time: 1 | 1:50 | | | | | |
| Component / Item Number and | RESULTS | Explanation / Notes | | | | | | |
| Description | NI RI TYPE IO | (Sketch Shall Be Attached Depicting Location Missing, Protruding, Unseated Wires) | OFAII | | | | | |
| | | | | | | | | |
| H46-39 steel Anchorage components | A | 1 missing wire, pulled for | 51 | | | | | |
| Anchorage compensions | | testing 10-21-2010 (see | e aver | | | | | |
| | | testing 10-21-2010 (see 6 data sheet 4) | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Results Legend: | | | | | | | | |
| NI - No Indi | | Indication IO – Information Only | | | | | | |
| A. Missing Wires | Recordable Indication H. Cracl | | Explain) | | | | | |
| B. Missing Button Heads | L. Pittin | g | | | | | | |
| C. Protruding / Unseated Wires D. Broken Wires | J. Nicks K. Unev | s, Gouges, Mechanical Damage ren Shim Stack | | | | | | |
| E. Active Corrosion F. Other Corrosion | | ssive Shim Gaps | | | | | | |
| F. Other Corrosion G. Evidence Of Free Water (Quantify | | et Seating Surface Damage ice Discontinuities, Deflections | | | | | | |
| Supplemental Information : Yes | | | | | | | | |
| | Results: Acceptable | Yes No | | | | | | |
| (Print & Sign) W. Rouce Robbins -W. | Panes Valle | LEVEL I DATE 10- | 21-2010 | | | | | |
| STATION/ADMIN REVIEW | TICO | | | | | | | |
| (Print & Sign) Eve | | DATE 10/28/2010 | | | | | | |
| RI or Unacceptable results Accepta | | valuator notes RI or Unacceptable condition | on. | | | | | |
| Additional Actions: | able Yes No | | | | | | | |
| (Action Request, Work Order, Issue Report, etc. | initiated for Corrective Action) | | | | | | | |
| LEVEL III or RI REVIEW (as applicable | | | | | | | | |
| | e) | DATE: | | | | | | |
| ANII REVIEW (as applicable) | e) Joseph & Stubby | DATE: DATE: //-4-10 | | | | | | |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| ﻮﺭﻩﺩ | гауе | | | | |
|---|--|--|--|--|--|
| Station: TMI Unit: 1 | Date: /0- | -21-10 | Report | No: MA | |
| WO No(s): R 2139507 | Tendon Anch | | H46-39 Tendo | | Field |
| Location: Tunnel, Gallery Buttress | <i>\</i> 4 | Eleva | | ng Plate I.D.: Jocate | |
| Bearing Plate I.D. Unable to A | nchor Head I.D. F | The second s | Bushing I. | | |
| Exam Type: DV XVT-1 | | f | Type Of Exam: | فصاحب المصافية الابتين بتبسية المتعاري ويتجرب وترجي والأصار والمتعاد والمتعار والمتعالي والمتعاد والمتعا | ······································ |
| As Found Exam | As Left Exam Follo | wing Reten | sioning Of Tendons Wh | ich Have Been Detent | ioned |
| Design Drawing(s) TMI-0016 | Visua | al Aids: No | ne | | |
| M&TE Used steel Ruke R-22 Gali Due | Construction of the second | or Serial No | | Cal. Due Date: 1/4 | |
| Illumination Used Flashlight | Illum | ination Veri | ied: Date: 10-21-10 | 2 Time: \$100 | A.M. |
| Special / Specific Instructions: | 4 | | | | |
| Component / Item Number and | RESULTS | | - | ion / Notes | |
| Description | NI RI TYPE | 0 (8 | ketch Shall Be Attache Missing, Protrudin | d Depicting Location (ng, Unseated Wires) | Df All |
| Tendon Anchorage on H 46-39 Butt. 4/ Field. | | A W | re missing puller -21-10. See E | L for testing | |
| Multipa a multipad | | | -21-10. Usee E | inclosure 6 | |
| H 46-39 Butt. 9/ Field. | | | ta sheet 4. | | |
| | | Va | ia Juces 7. | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Results Legend: NI - No Indi | notionn - RI Boon | rdabla Indiaa | ion IO - Information Onl | | 1 |
| | Recordable In | | | У | L |
| A. Missing Wires | H. | Cracks | | 0. Other (E) | (plain) |
| B. Missing Button Heads | l. | Pitting | | | |
| C. Protruding / Unseated Wires D. Broken Wires | J. K. | | ges, Mechanical Damage | | |
| E. Active Corrosion | n. L. | Uneven Sh Excessive S | | | |
| F. Other Corrosion | M. | | ting Surface Damage | | |
| G. Evidence Of Free Water (Quantify | | Surface Dis | continuities, Deflections | | |
| Supplemental Information : Yes X | | _Photo_[| _Video _ Other (Desc | cribe): | |
| | Results: Acceptat | ole AY | es 🗌 No | | |
| EXAMINER/EVALUATOR | 16 Deter | | | - DATE 10-2)- | D |
| (Print & Sign) Timothy C. Gibson fime | + | | LEVEL | DATE /0-2} | 1 |
| (Print & Sign) | Johnson (| \sim | DA | ATE 10/29/2010 | |
| This section to be complete | | er/Evalua | | | |
| RI or Unacceptable results Accepta | |] No | | - | |
| Additional Actions: | ta | | | | 1 |
| (Action Request, Work Order, Issue Report, etc. | initiated for Corrective A | Action) | | | |
| LEVEL III or RI REVIEW (as applicable | | | D | ATE | |
| ANII REVIEW (as applicable) | oh & Shelly | | D | ATE: 11-4-10 | |
| | Page 1 | _ of | | | |

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| ATTACHMENT 6 | | | | | | |
|--|--|--|--|--|--|--|
| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE | | | | | | |
| Report | | | | | | |
| Page 1 of 1 | | | | | | |
| Station: TMI Unit: Date: 10 - 20 - 2010 Report No: | | | | | | |
| System: Tendows Component: 2 Area of concrete Around H46-39 WO No(s): R2139507 | | | | | | |
| Location: Building: Containment Elev. 389'6" Col.: w/4 Row: w/4 Azimuth/Radius: w/4 | | | | | | |
| Exam Type: DV GV XVT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Coverede | | | | | | |
| Design Drawing(s) TMI 1-0015 Visual Aids: Now | | | | | | |
| Surface: ID (OD) Surface / Components Coated: YES X NO | | | | | | |
| M&TE Used: Sale R.716 34 II A Test Card UTC or Serial No. N/A Cal. Due Date: N/A | | | | | | |
| Illumination Used Flashlight Illumination Verified: Date: 10-20-2010 Time: 12:30 | | | | | | |
| Special / Specific Instructions: Component / Item Number and RESULTS Explanation / Notes | | | | | | |
| Description NI RI TYPE IO (As a minimum, Record Location and Size of) | | | | | | |
| (e.g. EIN, EID, etc.) Recordable Indications as applicable) | | | | | | |
| 2'Area of concrete around | | | | | | |
| H46-39 at buttress 6. Shop end. A 6"long stress crack extending fight vertically from the top terfiner corner of the bearing plate. | | | | | | |
| H46-39 at buttress 6. A 6 long stress crack extending fight shop end. Vertically from the top terfiner | | | | | | |
| Shop ever the top tettier | | | | | | |
| corner of the bearing plate. | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Results Legend: NI - No Indications RI - Recordable Indication IO – Information Only | | | | | | |
| NI - No Indications RI - Recordable Indication IO – Information Only Recordable Indication Type Codes: | | | | | | |
| A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting | | | | | | |
| B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metallic Items (Other) I. Popouts , Voids, Honeycomb O. Abrasion, Cavitation, Wear | | | | | | |
| C. Exposed Metallic Items (Other) I. Popouts , Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes | | | | | | |
| E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence | | | | | | |
| F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) | | | | | | |
| Supplemental Information : Yes No Sketch Photo Video Other (Describe): Results: Acceptable Yes No | | | | | | |
| Results: Acceptable Yes No EXAMINER/EVALUATOR //////////////////////////////////// | | | | | | |
| (Print & Sign) W. RANCE Robbins W. CANCE Kobbin LEVEL IN DATE 10-20-2010 | | | | | | |
| STATION/ADMIN REVIEW | | | | | | |
| (Print & Sign) Evan Johnson M DATE 10/29/2010 | | | | | | |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | | | | | | |
| RI or Unacceptable results Acceptable Yes No | | | | | | |
| Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | | | | | |
| LEVEL III or RE REVIEW (as applicable) | | | | | | |
| | | | | | | |
| ANII REVIEW (as applicable) Quesch & Shelly DATE: 11-4-10 | | | | | | |
| Page of | | | | | | |

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ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Date: 10-20-10 Station: TAT Unit: Report No: 1/1 1 Component: Concrete 24" around Anchor Plate Hy6-39 System Tendons WO No(s) .: A 2131507 Col.: N/A Building: Containment Elev.: 389'-5" Location: Row: MA Azimuth/Radius: 1/4 Exam Type: DV DV DV XVT-1C Type Of Exam: Direct Remote Mall. Type: Concrete Design Drawing(s) TMI 1-0016 Visual Aids: None Surface: D (OD) Surface / Components Coated: YES NO NO M&TE Used steel Rake A-46 ord-in Stest Card UTC or Serial No. NA Cal. Due Date: MA Illumination Used Flash light Illumination Verified: Time: 1050 PM Date: 10-20-10 NA Special / Specific Instructions: RESULTS Component / Item Number and **Explanation / Notes** Description RITYPE 10 (As a minimum, Record Location and Size of NE (e.g. EIN, EID, etc.) Recordable Indications as applicable) Concrete 24" around 10 Indications. anchor plate on Jendon H 46-39. Butt. 4/Field. **Results Legend:** NI - No Indications RI - Recordable Indication IO - Information Only **Recordable Indication Type Codes:** Cracks (Characterize and Size) G. Α. Settlements Or Deflections Scaling / Dusting Μ. ₿. Exposed Reinforcing Steel H. **Degraded Patches or Repairs** N. **Coating Deterioration** Exposed Metallic Items (Other) C. ł. Popouls , Voids, Honeycomb 0. Abrasion, Cavitation, Wear Evidence Of Grease Leakage D. Spalls J. P Air Voids / Bug Holes Evidence Of Moisture E. K, **Cold Joint Lines** Q. Efflorescence F. Leaching Or Chemical Attack **Corrosion Staining** R. Other (Explain) L. Supplemental Information : XYes No Sketch Sphoto Video Other (Describe): Results: Acceptable Aves No. EXAMINER/EVALUATOR LEVEL (Print & Sign) Trinotly C. Gibso. DATE 10-20

ATTACHMENT 6

()

 STATION/ADMIN REVIEW
 Event on Sen
 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition.

 RI or Unacceptable results Acceptable
 Yes
 No

 Additional Actions:
 (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action)
 DATE:

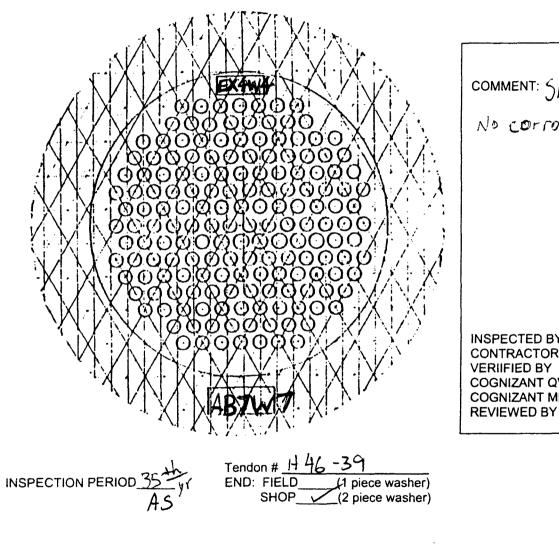
 LEVEL III or RE REVIEW (as applicable)
 DATE:
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 Page _L of _L
 2/9/1/4

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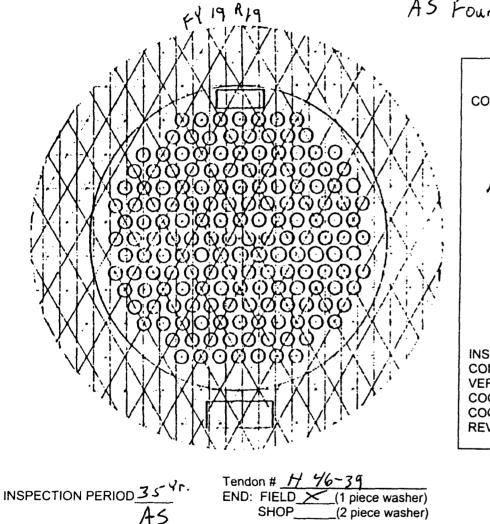
ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection AS Foond



COMMENT: Shim Strek 4. - 7.6" (2,1,1,1,1/8,1/2,2). No corrosion **INSPECTED BY** CONTRACTOR FOREMAN Date **VERIIFIED BY** Date 10-20-10 COGNIZANT QV INSPECTOR Date 29/00 COGNIZANT MECH/STRUCT ENGINEER

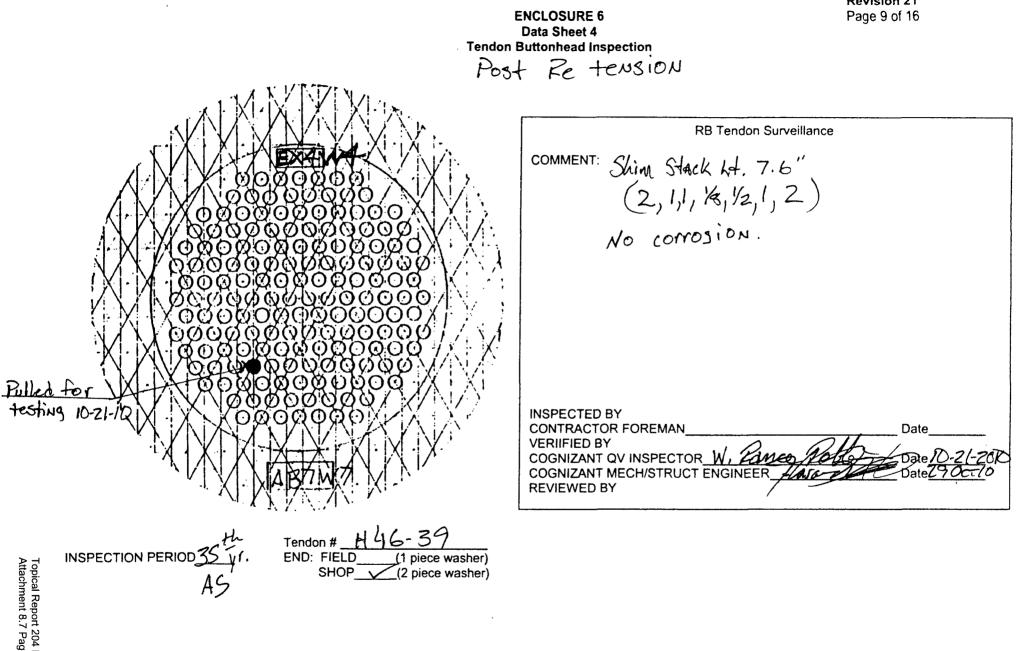
RB Tendon Surveillance

ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection AS Found Inspection

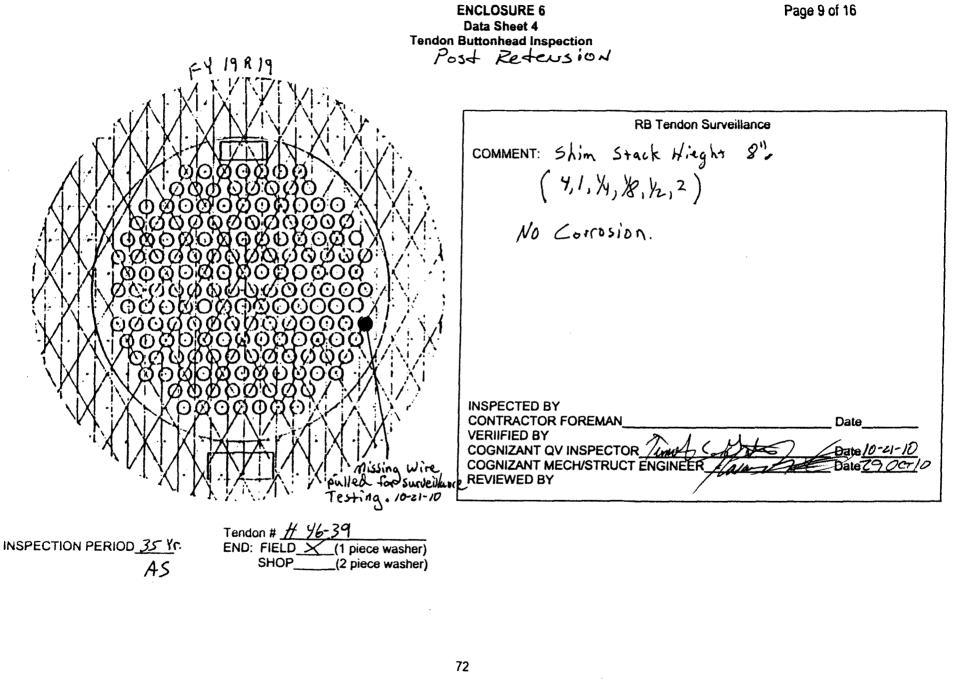


RB Tendon Surveillance





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| | | | | | | | | | CTION DOC | EDURE SQ 7.1 UMENTATION TA SHEET 7. July 31, 2009 Page 1 of Revision (|
|--------------|-------------------|------------------|--|--|---|----------------|----------|----------|--------------|---|
| | don No.: <u>H</u> | 46. | 39 | SURVEILLANCE Tendon E 7 W 7 Adaptor II | | | | 1435 6 | Shop I | wil |
| ſ | EQUIPMENT | | MICRO | METER | 1 | ŴĬF | RE | | SHIM | 8 |
| - | Thread | MI | c ID | Recal Date | | ID No. | Recal Da | te IC |) No. | Recal Date |
| ľ | Ext. Major | QC. | 38 | 4-5-11 | | | | | | |
| | Ext. Pitch | QC- | 38 | 4-511 | Se | +16 | 6-25-11 | 501 | 10 1 | 2-25-1D |
| Ī | Ext. Minor | | 38 | 45-11 | | VC | 12-25-1 | | _ | 2-25-10 |
| | Int. Major | l · | I/A | N/A | | | | NON MARK | 113240201543 | |
| | Int. Minor | Ņ | I/A | N/A | | | | | | |
| ; [| MEASUREME | NTS | · · · · · · · · · · · · · · · · · · · | THREAD | | Average | Wire | Wire | Shim | Average |
| D | Thread | Read | 310 | 6 th 9 th | REAGING | Westerner and | Constant | Diameter | Size | Dlameter |
| | Ext. Major | 1 | 9371 9370 | 9.37/ 9.378 9.372 9.375 | | | | | | 9.373 |
| Ī | Ext. | 1 | 9 537 | 9,546 | Ò | 1,545 | or4 | | ,032 | |
| ł | Pitch (1) Ext. | 2 | 9.547 9.458 | 9,465 | | | .254 | | | 9:259 |
| | Minor (2) | 2 | 9.460 | 9.469 | | 1,463 | | ,120 | ,032 | 9,191 |
| | lint. Major | 1 | N/A N/A | N/A N/A | | | | | | |
| ł | Int. Minor | 1 2 | N/A N/A | N/A N/A N/A N/A | | | | | | |
| F | Înț. | | Gauge ID: | N/A | Barvanes | Recal D | ale: N// | A | Result: | N/A |
| | Pitch | | So Gauge ID: | N/A | | Recal D | | | Result | N/A |
| L Note | | Minor Dia | | Average) – (Wire Average) – (2 X \ | | | | | | |
| | | | | · · · | | Trial 1 | Trial 2 | Trial 3 | Trial | <u>.</u> |
| | | Min N | linor Diam | Adaptor leter from Adaptor | The sector of the gamp of the sector of the | C6002 8.638 | | | | |
| | | | the second s | cceptable? (Yes | | 125 | | | | |
| QC : | Signoff: | Com | a fold | in the second se | | Level: | I | Date: / | 0.20-20 | 010 |
| ec | Reviewed: | my c. | Asta | | | Level: | Ħ | | 0-27-20 | |
| 3 5 / | | | | | | | | | | |

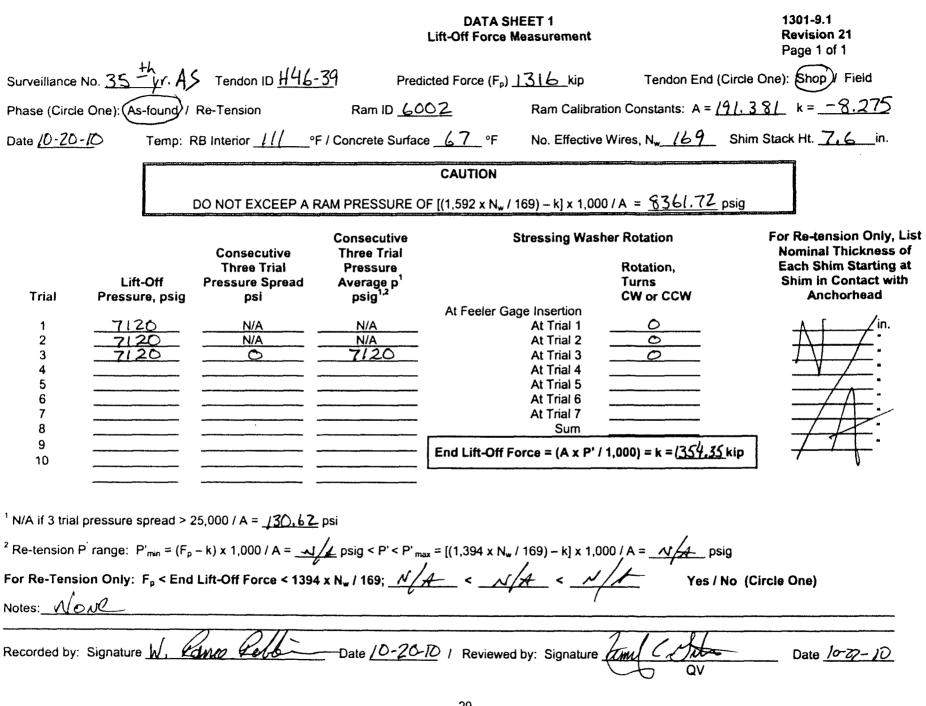
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| a de la companya de l | 35" YEAR TENDO 1 46-39 | N.SURVEILLANCE | End/Buttress No. | Field | /Butt. 4 | - |
|---|---------------------------|---------------------------------|---|------------|--------------|------------|
| ichorage ID. | Y 19 R19 | Adaptor I | D: <u> </u> | | | N |
| EQUIPMENT | MICR | OMETER | WIR | E | SH | IIMS |
| Thread | Mic ID | Recal Date | ID No. | Recal Date | ID No. | Recal Date |
| Ext. Major | QC-52 | y-5-11 | | | | |
| Ext. Pitch | Q6-52 | 4-5-11 | Set 5 | 6-25-11 | Suct | 12-25-10 |
| Ext. Minor | QC-52 | 1 84 | Dik. Red Blue | 12-25-10 | Sur 3 | 12-25-10 |
| Int. | N/A | N/A | NYA: IMA ISMC | | | |
| Major Int. Minor | N/A | N/A | | | | |
| MEASUREN | IENTS | THREAD | | Wire | Wire Shi | m Average |
| Thread | Read 3 rd | 6 th 9 th | Average | Constant D | lameter Siz | e Diameter |
| Ext. Major | 1 9,369 2 9,368 | | | | | 9.369 |
| Ext | 1 9.540 | 9.54/ | | ,254 | | |
| Pitch (1) Ext | 2 9.539 | | 9.540 | | . 180) | |
| Minor (2) | 2 9, 460 1 N/A | 9.461 | 9.460 | | 240 . 03 | 2 9.188 |
| Int. Major | 1 N/A 2 N/A | N/A | | | | |
| Int. Minor | 1 N/A 2 N/A | | | | | |
| .Int, | Go Gauge I | | Recal D | ate: N/A | Result: | N/A |
| Pitch | No-Go Gau | | Recal D | | Result | |
| (2) Externa | al Minor Diameter | | e Constant] - [Shim S Wire Diameter] - [Sh | | | |
| DISPOS | ITION | | Trial 1 | Trial 2 | Trial 3 T | Frial 4 |
| . : | Min. Minor D | Adapt iameter from Adapte | or Mark C6001 or Table 8,6/2 | | | <u> </u> |
| - | <u></u> | Acceptable? (Ye | | | | |
| C Signoff: | Time Cre | 2000 | Level: | π | Date: 10-20- | - JD |

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| | | | | DATA SHEET 1 Lift-Off Force Measurement | | 1301-9.1 Revision 21 Page 1 of 1 |
|---|---|---|--|---|---|--|
| Surveillance | No. 3541. AS | Tendon ID <u>H46</u> | -39 Prec | licted Force (F _p) <u>1316</u> kip | Tendon End (Ci | rcle One): Shop Field |
| Phase (Circle | e One): As-found / | Re-Tension | Ram ID <u>600</u> | Ram Calibra | ation Constants: $A = 1^{\circ}$ | 11.18/ k=-8.352 |
| Date 10-20 | -/0 Temp: I | RB Interior ///ºI | F / Concrete Surfac | ce <u>63</u> °F No. Effective | e Wires, N _{w_} /69 S | Shim Stack Ht. <u>8</u> in. |
| | | | | CAUTION | atrada ta ang ² ata <u>manang kitang na pang</u> adi na kitang pangang katang kata | |
| | | DO NOT EXCEEP A F | RAM PRESSURE (| DF [(1,592 x N _w / 169) – k] x 1,00 | 00/A = <u>8370,87</u> ps | ig |
| - | Lift-Off | Consecutive Three Trial Pressure Spread | Consecutive Three Trial Pressure Average p ¹ | Stressing Was | Rotation, Turns | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with |
| Trial 1 2 3 4 5 6 7 8 | Pressure, psig 7320 7320 7320 | psi <u>N/A</u> <u>N/A</u> <u>o</u> | psig ^{1,2} <u>N/A</u> <u>732D</u> | At Feeler Gage Insertion At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | CW or CCW | Anchorhead |
| 9 10 | | | ······································ | End Lift-Off Force = (A x P' | / 1,000) = k = <u>/39/.09</u> k | ip" |
| ² Re-tension F For Re-Tensi Attachment Report 8,1 | $P' range: P'_{min} = (F_p ion Only: F_p < End$ | • | psig < P' < P' | ax = [(1,394 x N _w / 169) – k] x 1,0 ↓ < < ↓ < < ↓ Reviewed by: Signature | <u>A</u> Yes / No | Date <u>10-27-10</u> |
| 204 Revion 0 7 Page 46 of 523 | | | | 29 | | |

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| P | roject: TMI | 35 TH YEAR TENDON | SURVEILLANCE | | | IT 1 | |
|--------------|----------------------------------|---|---|---|------------------|---|-------------------|
| | idon No.; noval Date: | <u>H 46-39</u> 10-21-2010 | Tendon End: Inspection Date: | Buttress 6 10-21-2010 | Shor | Fiel | d |
| | | | WIRE REMO | VAL INSPECTION | | | |
| B.5 or | .4.1.1) Docume Corrosion Leve | PECTION @ LENGTH I nt the Corrosion Catego I E document condition nt the total length of the Buttonhgad End | ry for each 10' of wire in on an NCR. | NCR Req | | | N/A |
| ; | × _ | sample ** 1 | <u> </u> | naire donarda da d | 20' | ĺ | , 30 ⁷ |
| | 30' | 1 | 40' | and a construction of the construction of the second second second second second second second second second se | 50° | | 60' |
| | <u>ко</u> | smple#2 | 70' | (| 80' | r namenarise na ser e anasser T | 90' |
| ×. | 90' | es marifa recordences e con moi se con maisie I | nario ante ante de la companya de la 100' | resorantesiani sonii nee provene si | 110 ¹ | ALAH Z | 120' |
| 9 · | 120' | | 130' | | 140' | Aprici | 160' |
| • | 150' | 5'2'4"+13% | = 160' 155' 35 | 18" Total leng | 17% | na safat fan Drai ing rangera | 180' |
| | 180' | andenners andressen, here a name as here sinds a land a land a land a second and a second a second a second a s | 190' | a na | 200' | annar ann a saona an sao an | 210' |
| | 210' | | 220' | | 230' | | 240' |
| 6 | 240' | | 250' | | 260' | | 270' |
| | 270' | | 280' | | 290' | | 300' |
| 5 | 300' | and contract francis solutions and | 310' | | 320' (| ut End | 330' A |
| 9.7) 9.8) | Document the | vire cut for samples: , location of wire remove loe: <u>Steel Rule</u> ID Number: <u>N</u> | d on Data Sheet 8.0, A ID | ient lhe area of remov INCHORAGE INSPECTION Number: <u><u><u>R</u>-21</u></u> | | ibol X. ompleted Date: <u>6-24</u> | -11 |
| | .C ector:, | Pance Rollin | Level: | I | Date: | <u>10-21-201</u> | 6 |
|) C levi | ewed Tran | Colton | Level: | T | | 10-27-201C |) |

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|---|---|
| Attachment 8.7 Page 47 of 52 | 2 |

| | TMI - Unit 1 Surveillance Procedure | 1301-9.1 |
|-----------------------------------|--|--------------|
| Title | | Revision No. |
| RB Structural Integrity Te | ndon Surveillance | 21 |

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DATA SHEET 4

Page 1 of 4

I Number

Surveillance No. 35 57

Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons

Tendon ID <u>#46-39</u>

Part 1 Original Stressing Data

NOTE

PTF force is that equivalent to a ram pressure of 1,000 psl. PTF removes tendon stack and is the starting point for elongation measurements. OSF force is 80% (may be less) of tendon ultimate strength. The tendon is loaded to OSF in order to provide the required force distribution. It is also the force at which final elongation is measured. PTF force / elongation, OSF force / elongation and number of effective wires are documented in construction records.

| Table 1 | | | | | |
|---------|--|------------|--|--|--|
| Row, R | Parameter | Value | | | |
| 1 | Shop End PTF Force | 200,4 klp | | | |
| 2 | Field end PTF force | 199.6 KIP | | | |
| 3 | Mean PTF Force = (R1 + R2) / 2 | 200.0 kip | | | |
| 4 | Shop End PTF Reference Distance | 3,5 in. | | | |
| 5 | Field End PTF Reference Distance | 2.8 In. | | | |
| 6 | Net PTF Reference Distance = R4 + R5 | 6,3 in. | | | |
| 7 | Shop End OSF Force | 1588.9 kip | | | |
| 8. | Field end OSF force | 1588.3 kip | | | |
| 9 | Mean OSF Force = $(R7 + R8)/2$ | 1588.6 kip | | | |
| 10 | Shop End OSF Reference Distance | 8,3 in. | | | |
| 11 | Field End OSF Reference Distance | 8.6 In. | | | |
| 12 | Net OSF Reference Distance = R10 + R11 | 16,9 in. | | | |
| 13 | Differential Force = R9 - R3 | 1388,6 kip | | | |
| 14 | Differential Elongation = R12 - R6 | 10.6 in. | | | |
| 15 | Number of Effective Wires | 169 | | | |
| 16 | Elongation Rate = R14 x R15 / R13 | 1.29 | | | |

32

Number

<u>1301-9.1</u>

Revision No.

RB Structural Integrity Tendon Surveillance

DATA SHEET 4

TMI - Unit 1 Surveillance Procedure

Page 1 of 4

21

Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons

Tendon ID <u>H 46 39</u>

Tille

Surveillance No.3

Part 1 Original Stressing Data

NOTE

PTF force is that equivalent to a ram pressure of 1,000 pst. PTF removes tendon slack and is the starting point for elongation measurements. OSF force is 80% (may be less) of tendon ultimate strength. The tendon is loaded to OSF in order to provide the required force distribution. It is also the force at which final elongation is measured. PTF force / elongation, OSF force / elongation and number of effective wires are documented in construction records.

| Table 1 | | | | | |
|---------|--|--------|-----|--|--|
| Row, R | Parameter | Value | | | |
| 1 | Shop End PTF Force | 200.4 | kip | | |
| 2 | Field end PTF force | 199.6 | kip | | |
| 3 | Mean PTF Force = (R1 + R2) / 2 | 200,0 | klp | | |
| 4 | Shop End PTF Reference Distance | 3,5 | In, | | |
| 5 | Field End PTF Reference Distance | 2.8 | in. | | |
| 6 | Net PTF Reference Distance = R4 + R5 | 6.3 | in. | | |
| 7 | Shop End OSF Force | 1588.9 | kip | | |
| 8 | Field end OSF force | 1588.3 | kip | | |
| 9 | Mean OSF Force = (R7 + R8) / 2 | 15886 | kip | | |
| 10 | Shop End OSF Reference Distance | 8.3 | in. | | |
| 11 | Field End OSF Reference Distance | 3.6 | ln. | | |
| 12 | Net OSF Reference Distance = R10 + R11 | 16.9 | ln. | | |
| 13 | Differential Force = R9-R3 | 13881 | kip | | |
| 14 | Differential Elongation = R12-R6 | 10,6 | in. | | |
| 15 | Number of Effective Wires | 169 | | | |
| 16 | Elongation Rate = R14 x R15 / R13 | 1.29 | | | |

| | | 1 | | Number | |
|--------------|------------|--|------------------------------|---------------------|--------------------|
| | | TMI - Unit Surveillance Pro | | | 301-9.1 |
| Title | | | | Revision N | 0. |
| RB St | ructural h | ntegrity Tendon Surveillance | | | .21 |
| | | DATA SHEET Elongation / Tendon For Re-Tensioning Data for De-Ter | rce Record Isloned Tendon | 8 | Page 2 of 4 |
| Tendon | ID H 46. | 39 | S | urveillance No. | $35 \frac{14}{4r}$ |
| | | Part 2 | | | / |
| | | Shop End Re-Tensioni | ng Data | | |
| Ram ID | 6002 | Ram Area, A 191.38 | in ² i | Ram k <u>- 8,27</u> | 5 kip |
| | | NOTE | | | |
| | | The number of effective wires entered in R1 r number entered for the field end in Table 3. Identified in Rows 4, 16, 18 & 19 (shaded) ma work at both ends of the tendon is complete. | Also, the calculat | ions | |
| | [| Table 2 | | | |
| | Row, R | Parameter | Value | Signalure | Date |
| | 1 | Number of Effective Wires | 168 | WRR | 10.21 |
| | 2. | PTF Target Pressure | 1,000 psl | WRR | 10-21 |
| | 3 | PTF Actual Pressure | 10 80 psi | NRR | 10-21 |
| | (9) (A | A CLIPTPACIUALFORCER=IR3X/AV1000-R | 1984) KP | WRA | 10:21 |
| | 5 | PTF Reference Distance | 2,4 In. | WRR | 10-21 |
| | 6 | OSF Maximum Force = R1 x 9.4 | 1579.20kip | WRR | 15-01 |
| | 7 | OSF Max. Pressure = 4000 (R6 + k) / A | 8294,84 psi | WRR | 10-21 |
| | 8 | 1/3 Pressure Interval = R7 / 3 - 330 | 2434,94 psi | WRR | 10-21 |
| | 9 | Target 1/3 Pressure = 1,000 + R8 | 3440 psi | WRR | 10-21 |
| | 10 | Actual 1/2 Decennica | whilis not | | 10 |

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| | | 10111101 | | 1001 |
|----------|--|-------------|-------|---------|
| 8 | 1/3 Pressure Interval = R7 / 3 - 330 | 2434,94 psi | WRR | 10-21 |
| 9 | Target 1/3 Pressure = 1,000 + R8 | 3440 psi | WRR | 10-21 |
| 10 | Actual 1/3 Pressure | 34418 psi | WRR | 10-21 |
| 11 | 1/3 Reference Distance | 5.1 in. | WRR | 10-21 |
| 12 | Target 2/3 Pressure = R9 + R8 | 5874,94psi | WRR | 10-21 |
| 13 | Actual 2/3 Pressure | 5790 psl | WRR | 10-2 |
| 14 | 2/3 Reference Distance | 6.7 in. | WRR | 10-21 |
| 15 | OSF Actual Pressure | 8290 psl | WRR | 10-21 |
| . | OSFActual Force (#16 x A/1000#)k | 578 27 KP | WEL. | 1071 |
| 17 | OSF Reference Distance | 8.6 In. | WRR | 10-21 |
| 18 | State All Dillerentialiforce =1816=184 | 113193(BR) | NRE | 102 |
| 19 | 22 State Row | 6.26 | WER - | 6 16 21 |

| | 1 | Number |
|----------------------------|---|------------------------|
| | TMI - Unit 1 Surveillance Procedure | 1301-9.1 |
| Tille | | Revision No. |
| RB Structural Integ | rity Tendon Surveillance | 21 |
| | DATA SHEET 4 Elongation / Tendon Force Record Re-Tensioning Date for De-Tensioned Tenc | Page 3 of 4 |
| Tendon ID <u>H46-39</u> | P | Surveillance No. 35 th |
| | Part 3 Field End Re-Tensioning Data | |
| Ram ID 6001 | Ram Area, A <u>191.181</u> in ² | Ram k -8.352 klp |
| | NOTE | ······ |
| nur Ide | number of effective wires entered in R1 must be the suber entered for the shop end in Table 2. Also, the calculation of the shop and in Table 2. Also, the calculation of the tendon is complete. | culations |

| | Table 3 | | | |
|---|--|---------------|----------------|----------|
| Row, R | Parameter | Value | Signature | Date |
| 1 | Number of Effective Wires: | 168 | Lus. | 10-4-10 |
| 2 | PTF Target Pressure | 1,000 psi | 7.49. | 10-21-10 |
| 3 | PTF Actual Pressure | 1080 psi | 7.65. | 10-6-10 |
| $\eta \in \mathcal{Y}_{c}$ | sa Autori Adulthora Chasta Autora I | 的。 新知道 | She She Sh | |
| .5 | PTF Reference Distance | 5 in. | 7.003. | 10-21-10 |
| 6 | OSF Maximum Force = R1 x 9.4 | 1579.20 kip | 7.05. | 10.14/0 |
| 7 | OSF Max. Pressure = 1000 (R6 + k) / A | \$ 903,92 psl | 203 | 10-21-10 |
| 8 | 1/3 Pressure Interval = R7 / 3 - 330 | 2437,97 psi | 7.003 | 10-21-10 |
| 9 | Target 1/3 Pressure = 1,000 + R8 | 3440 psl | 7.1.5. | 10-21-10 |
| 10 | Actual 1/3 Pressure | 3440 psl | 2.65. | 10-2+10 |
| 11 | 1/3 Reference Distance | 5.6 in. | 7.05 | 10-21-10 |
| 12 | Target 2/3 Pressure = R9 + R8 | 5817,97 psi | 7.03. | 10-11-10 |
| 13 | Actual 2/3 Pressure | 5790 psl | 7,05 | 10-21-10 |
| 14 | 2/3 Reference Distance | 7.2 In. | 7.05- | 10-11-10 |
| 15 | OSF Actual Pressure | 8290 psi | Rus. | 10-21-10 |
| 16 | COSEACUE/FOREVERSIEXA/1000-AF | 1.12 830 6 | | 80553 |
| 17 | OSF Reference Distance | 9 in, | 7.43. | 10-27-10 |
| 1. A. | is a statistic lipiterenitatiforcar a 15/15 (BA) | She Olekipi | 1.22.30 | A SHARE |
| 18 | Differentialle iongenons = 15177 - 186 | 274551400 | 1.128 1. 2. 3. | in suite |

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Part 4 **Elongation Comparison** ٦ Tabl .

| | Table 4 | |
|-------------|---|--------|
| Value | Parameter | Row, R |
| 1379.86 Kip | Shop End Differential Force from Table 2, R18 | i [|
| 1378,41 kip | Fleid End Differential Force from Table 3, R18 | 2 |
| 1379.19 kip | Average Differential Force = (R1 + R2) / 2* | 3 |
| 6,2 in. | Shop End Differential Elongation from Table 2, R19 | 4 |
| 4.0 in. | Field End Differential Elongation from Table 3, R19 | 5 |
| 10,2 in. | Total Elongation = R4 + R5** | 6 |
| 168 | Number of Effective Wires from Table 2, R1 | 7 |
| 1.24 | Re-Tensioning Elongation Rate = R6 x R7 / R3 | 8 |
| 1.29 | Original Elongation Rate from Table 1, R16 | :9 |
| .03 | Fractional Difference in Rates = (R8 - R9) / R9 | 10 |

Absolute value of the above Fractional Difference in Rates < 0.1

* For vertical tendon = R1

** For vertical tendon = R4

Jance Pelle= Signature: W

____ Date: 10-21-2010

Re-Tensioning Data for De-Tensioned Tendons

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Surveillance No.

TMI - Unit 1 1301-9.1 Surveillance Procedure Revision No. Tille **RB Structural Integrity Tendon Surveillance** 21

DATA SHEET 4

Elongation / Tendon Force Record

Tendon ID H 46-39

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Number

35

No

Yes_

Surveillance Procedure **Revision No. RB Structural Integrity Tendon Surveillance** 21

TMI - Unit 1

DATA SHEET 4 **Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons**

Tendon ID 1446-39

Tille

| Part 4 |
|------------------------------|
| Elongation Comparison |
| |

| | Table 4 | | | | | |
|-----------------------|---|-------------|--|--|--|--|
| Row, R | Parameter | Value | | | | |
| 1, | Shop End Differential Force from Table 2, R18 | 1379.86 kip | | | | |
| 2 | Field End Differential Force from Table 3, R18 | 1378,41 kip | | | | |
| 3 | Average Differential Force = (R1 + R2) / 2* | 1379,13 Kip | | | | |
| 4 [±] | Shop End Differential Elongation from Table 2, R19 | 6.2 in | | | | |
| 5 | Field End Differential Elongation from Table 3, R19 | 4.0 in | | | | |
| 6 | Total Elongation = R4 + R5** | 10.2 In | | | | |
| 7 | Number of Effective Wires from Table 2, R1 | 168 | | | | |
| 8 | Re-Tensioning Elongation Rate = R6 x R7 / R3 | 1.24 | | | | |
| 9 | Original Elongation Rate from Table 1, R16 | 1.29 | | | | |
| 10. | Fractional Difference in Rates = (R8 - R9) / R9 | .03 | | | | |

Absolute value of the above Fractional Difference in Rates ≤ 0.1

* For vertical tendon = R1

** For vertical tendon = R4,

Signature: W. Ring Koll ----

Date: 10-21-2010

Surveillance No.

1301-9.1

Nümber

Page 4 of 4

Yes_V

No _____

| | | | | DATA SHEET 1 Lift-Off Force Measurement | | 1301-9.1 Revision 21 Page 1 of 1 |
|--|--|---|--|--|----------------------------------|--|
| Surveillance | No. 35 4 AS | Tendon ID <u>H46</u> | - <u>39</u> Pred | icted Force (F _p) <u>1314</u> kip | Tendon End (Circle | e One): Shop/ Field |
| Phase (Circl | e One): As-found A | Re-Tension | Ram ID 60 | 0Z Ram Calibra | ation Constants: A = <u>/9/.</u> | 381 k = -8.275 |
| Date /0 -2/ | -2010 Temp: | RB Interior09° | F / Concrete Surfac | e <u>58</u> °F No. Effective | e Wires, N <u>w 168</u> Shir | m Stack Ht. 7.6 in. |
| | | DO NOT EXCEEP A F | RAM PRESSURE C | CAUTION DF [(1,592 x N _w / 169) – k] x 1,00 | 00/A = <u>8312.57</u> psig | |
| Trial 1 2 3 4 5 6 7 8 9 10 | Lift-Off Pressure, psig 6930 6930 | Consecutive Three Trial Pressure Spread psi N/A N/A O | Consecutive Three Trial Pressure Average p ¹ psig ^{1,2} <u>N/A</u> <u>N/A</u> <u>6930</u> | Stressing Was At Feeler Gage Insertion At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum End Lift-Off Force = (A x P' | Rotation, Turns CW or CCW | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead |
| ² Re-tension For Re-Tens Notes: | P [°] range: P' _{min} = (F _f sion Only: F _p < Enc | Lift-Off Force < 1394 | 1,47 psig < P' < P' _{mi} 4 x N _w / 169;3 | ax = [(1,394 x N _w / 169) k] x 1,0 <u> 6 </u> | <u>(5,75</u> Yes/No ((| |

| | | | DATA SHEET 1 Lift-Off Force Measurement | | 1301-9.1 Revision 21 Page 1 of 1 | |
|--|--|---|--|---------------------------------|--|--|
| Surveillance No. 35 4r- | Tendon ID <u># 46-</u> | 3 <u>q</u> Predi | cted Force (Fp) 13/6 kip | Tendon End (Circ | de One): Shop (Field) | |
| Phase (Circle One): As-found | Re-Tension | Ram ID <u>600</u> | Ram Calibra | tion Constants: A = /9 | 1.181 k = -8.352 | |
| Date 10-21-10 Temp | RB Interior 109 | F / Concrete Surface | e 62 °F No. Effective | Wires, N. 168 S | him Stack Htin. | |
| | | | CAUTION | | | |
| | DO NOT EXCEEP A F | RAM PRESSURE O | F [(1,592 x N _w / 169) - k] x 1,00 | 10/A = 832/.59 psi | 9 | |
| Lift-Off Trial Pressure, psi 1 <u>70 y0</u> 2 <u>70 y0</u> 3 <u>70 y0</u> 4 5 6 7 8 9 | Consecutive Three Trial Pressure Spread psi <u>N/A</u> <u>o</u> | Consecutive Three Trial Pressure Average p ¹ psig ¹² <u>N/A</u> <u>704D</u> | Stressing Was At Feeler Gage Insertion At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 5 At Trial 6 At Trial 7 Sum End Lift-Off Force = (A x P' | Rotation, Turns CW or CCW | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead | |
| ¹⁰ ¹ N/A if 3 trial pressure spread > 25,000 / A = <u>130.76</u> psi ² Re-tension P' range: P'_mbs = (F _p - k) x 1,000 / A = <u>6927.21</u> psig < P' < P'_msx = [(1.394 x N _w / 169) - k] x 1,000 / A = <u>7292.06</u> psig For Re-Tension Only: F _p < End Lift-Off Force < 1394 x N _w / 169; <u>/3/6</u> < <u>/337.56</u> < <u>/385.75</u> (res)/ No (Circle One) Notes: <u>Vone</u> Recorded by: Signature <u>Append C. Append</u> Date <u>/0-27-10</u> / Reviewed by: Signature <u>W</u> , <u>Awee</u> <u>followe</u> Date <u>10-27-10</u> QV | | | | | | |

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Topical Report 204 Revion 0 Attachment 8.7 Page 55 of 523

| Project: TMI 35 TH YEAR TENDON SURVEILLANCE Tendon No::::::::::::::::::::::::::::::::::: | | > | | PSC PROCEDURE SO 12.0 REPLACE GREASE CAP Data Sheet 12.0 July 31, 2009 Page 1 of 1 Revision 0 |
|---|-------------|--|----------|--|
| ANCHORAGE INSPECTION CRITERIA BEARING PLATE SURFACE PROPERLY PREPARED: Alves NO GREASE CAP SURFACE PROPERLY PREPARED: Alves NO GASKET MATING SURFACE PROPERLY PREPARED: Alves NO STUD/BOLT HOLES PROPERLY PREPARED: Alves NO FOREIGN MATERIAL EXCLUSION CONTROLLED: Alves NO COMMENTS Moule NO COMMENTS Moule Image: Alves Image: Alves | Project: TN | MI 35 TH YEAR TENDON SURVEILLANCE | | <u></u> |
| 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 FOREIGN MATERIAL EXCLUSION CONTROLLED: YES NO COMMENTS NOUR YES NO | Tendon No.: | H46-39 Tendon End: Buttress | 6 Shop | Field |
| | | ANCHORAGE INSPECTION CRITE | ERIA | |
| GREASE CAP SURFACE PROPERLY PREPARED: Image: Comparison of the comparison | | BEARING PLATE SURFACE PROPERLY PREPARED | KLYES | |
| | | | | |
| | | | - | |
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| | | | | |
| CREW FOREMAN SIGNOFF Althouty Date: 10-21 | · | COMMENTS | <u> </u> | |
| CREW FOREMAN SIGNOFF Attack Ut Date: 10-21 | | | | |
| CREW FOREMAN SIGNOFF (10-21) Date: 10-21 | | | | |
| Dale. 10-DU | | MANI SIGNOFE / Pite Cal. Jut-D- | | Dalo: 10-21-10 |
| ac Reviewed: Jump C-Sta Level: T_ Date: 10287 |) | ALC II | T | Date: 10-2810 |

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| RSS |) | | | | PSC PROCEDURE SQ 12.0 REPLACE GREASE CAP Data Sheet 12.0 July 31, 2009 Page 1 of 1 Revision 0 |
|-------------|---------------------------------|----------------|---|---|--|
| Project: TN | MI 35 TH YEAR TENDON | SURVEILLANCE | | an an an an Allen an Anna an Anna an Allen an Anna an A | |
| Tendon No.: | H 46-39 | Tendon End: | Butt. Y | Shop | Field |
| | | ANCHORAGE IN | SPECTION CRIT | ERIA | |
| | BEARING PLATE SUI | | PREPARED: | PYES | no |
| | GREASE CAP SURFA | | REPARED: | X-YES | NO NO |
| | GASKET MATING SU | RFACE PROPERLY | PREPARED: | M YES | |
| | STUD/BOLT HOLES | PROPERLY PREPA | RED: | YES | |
| | FOREIGN MATERIAL | EXCLUSION CON | ROLLED: | YES | |
| | COMMENTS Nore | | | | ······································ |
| | | | •••••••••••••••••••••••••••••••••••••• | | |
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| | | | | and a state of the way | |
| CREW FORE | | Ateh | ito_ | | Date: <u>10 - 21-10</u> |
| QC Reviewe | a Jumel (1) | Jobs | Level: | T | Date: 10-28-10 |

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|---|---|
| Attachment 8.7 Page 57 of | |



PSC PROCEDURE SQ 12:1 GREASE REPLACEMENT Data Sheet 12:1b - Hand Pumping July 31, 2009 Page 1 of 1 Revision 0

| Project: TMI 35 th YEAR TENDON SURVEILLANCE | | 16-39 |
|---|--|-----------------|
| GREASE REPLACEMENT | | QC SIGNOFFS |
| (8.4) Grease Used The NEW COLD - TEST DATE: CACCEPTABLE [| APPROVAL LETTER | 2(0) 10-21-10 |
| (8.5) Total Grease Loss from Data Sheet 6.0 for Butt Field tendon end: | gal | 103 10-21-13 |
| (8.6) Total Grease Loss from Data Sheet 6.0 for Batt / Shop tendon end: | gal. | 200-10-21-10 |
| (8:7) Estimated grease losses from leaks for Buttel Field tendon end: | O gal | 7.10 10-27-10 |
| (8.8) Estimated grease losses from leaks for But 5hop tendon end: | O gal. | 24 10-24-10 |
| (8.9) TOTAL Tendon Grease Loss: | J. S gal. | 1.W. 10-2+ 10 |
| 13.0 POURING AND HAND PUMPING - FIRST END | | |
| (13:6) Ambient Temp.: 65 °F Thermometer ID: 26-703 Recal Date: | 6-23-11 | |
| (13.7) Grease Temp.: 220 °F Thermometer ID: PK-103 Recal Date: | 6-23-11 | |
| (13.9) Initial Grease Height (a) <u>24</u> in. (13.12) <u>Final</u> Grease Height (b) | 22.25 in | |
| (13.14) Total amount of Grease added: $3, 0.9$ gal. $(a - b) \times 1.77$ into the | Field end | |
| 3:16) Quantity of Waste Grease: d gal. (13:15) Revured | Hand Pumped | |
| (13:17) Total Grease Replaced this end: 3:09 gal. | | 14.10-31-10 |
| 13.0 HAND PUMPING - SECOND END | . ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ | |
| (13.6) Ambient Temp: 65 °F Thermometer ID: 1. 7 K-J03 Recal Date: | 6-23-11 | |
| (13.7) Grease Temp.: 220 °F Thermometer ID: 98-103 Recal Date: | 6-23-11 | |
| (13.9) Initial Grease Height (a) 22.25 in. (13.12) Final Grease Height (b) | 20,75 in. | |
| (13.14) Total amount of Grease added: $2,65$ gal. (a - b) x 1.77 into the | Shop end | 8 8. 6 |
| (13.16) Quantity of Waste Grease: Ø gal. (13.15) 🖳 Roured | Hand Pumped | |
| (13.17) Total Grease <u>Replaced</u> this end: 2.65 gal. | | 201.10-21-10 |
| 14.0 CALCULATION OF PRESSURE PUMPING | | · |
| (14.1) Total <u>Tendon</u> Grease Replaced: <u>$5, 9$ gal.</u> (13.17 + 13.17) | | |
| (14.2) Net Tendon Duct Grease Volume: 1/5, 26 gal. Refer to SQ 12.2 - GREASE VOLUMES | , for the Tendon Net Duct Volume | |
| (14.3) Percent Difference: Total Tendon Replaced (14.1) - Total Tendon Loss (8.9) Net Tendon Duct Grease Volume (14.2) × 100 = | 3.27 % Difference | 111100-21-10 |
| (14.4) Grease Leaks: 🔲 Yes 🎦 No | 2.81 088 | 24. 10-21-10. |
| (14:5) Refill Acceptable: Yes (less than 10%) INO (greater than 10%) | | 7.60 10.25 10 |
| If No – Customer Notified NCR No.: //// | <u></u> | ALA. JOZH HU |
| (14.6) Comments: None | an da ana ang ang ang ang ang ang ang ang an | |
| Reviewed: W, Came Collense Level: 27 | Date: 10-2 | 7-2070 |
| | | n y |
| | | |
| | - 26 SQ 12 | 1 TM 09 ISI doc |

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| | DCEDURE SQ 6 E CAP REMOVA Data Sheet 6. July 31, 200 Page1 of Revision |
|---|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | 17-19-19-19-19-19-19-19-19-19-19-19-19-19- |
| (7.2) Tendon No:: <u>H464</u> Tendon End: <u>Buttvess</u> 6 Shop | Field |
| Grease Cap Removal | |
| (7.5)Date Removal Started: $10 - 2.0 - 2.010$.(7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes \boxtimes No(7.7) Temp. of Concrete: $56 \circ F$ Thermometer No.: $5T & 82$ Re-Cal Date: $6 - 23 - 11$ Amblent Temp.: $55 \circ F$ Thermometer No.: $PK 102$ Re-Cal Date: $2 - 9 - 11$ (8.4) Anchorhead I.D.: $919/ABSW5$ Anchorhead Verification: \boxtimes Match \square No-Match | Q.C. Signof <u>NPR 10-20-10</u> NPR 10-20-10 |
| (8.5) Grease Coaling Grease Cap - Complete Partial Uncoated % Buttonheads - Complete Partial Uncoated % Anchorhead - Complete Partial Uncoated % Shims - Complete Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete Partial Uncoated % (1) - Limited within the inside diameter of the grease cap. 9 9 9 | WR 10-201 |
| (8.7) Grease Color Match: Xes INo. Grease Color: Med Brown Comments: Nork | UCE 10-20-10 |
| (8.8) Quantity of Samples 2 Quart Samples Identified per Step 8.8.1? 🛛 Yes 🗌 No Location of 🖾 A.H. 🗋 B.P. 🖾 Shims 🗍 Cap 🗍 Duct | WRP 10-20-10 |
| (8.9) Qly. of Grease lost during removal of cap: | NPR 10-70-10 NPP 10-20-10 NRP 10-20-10 NRP 10-20-10 NRP 10-20-10 |
| 10.3) Method of Tendon Protection: <u>Binstalled the grase CAN N/A NEW GASKet</u> 10.4) Amount of Grease Loss from Tendon duct: O gal. | NR 10-20-10 |
| 10.5) Total quantity of lost grease (below): (8.8) $\underline{S} + (8.9) \underline{O} + (8.9.1) \underline{O} + (9.6) \underline{.2S} + (10.4) \underline{O} = \underline{.75}$ TOTAL 11.1.2) Document TOTAL grease lost on Data Sheel 12.1, GREASE REPLACEMENT. $\forall Yes$ \Box No 3C Reviewed: delta delta d | 12 10-20-10 VR 10-20-10 D-27-10 |

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| | OCEDURE SQ 6.0 SE CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|---|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (7.2) Tendon No.: H 46-4/ Tendon End: Field Butt. 4 Shop | 🔀 Field |
| Grease Cap Removal | |
| | Q.C. Signoff |
| 7.5) Date Removal Started: <u>/0-20-/0</u> 7.6) Dry Ice Used on Grease Cap and/or Anchorage Yes XTNo | |
| 7.7) Temp. of Concrete: <u>52 °F</u> Thermometer No.: <u>θk-/03</u> Re-Cal Date: <u>6.23.11</u> | |
| Ambient Temp.: 50 °F Thermometer No.: 57-78 Re-Cal Date: 6-23-1/ | 1.1. 10-20-1 |
| | 7.03.10-20.40 |
| 8:4) Anchorhead I.D.: <u>971</u> Anchorhead Verification: XMatch Do-Match | 200.10 2010 |
| 8.5) Grease Coating Grease Cap - Complete / Partial Uncoated % Buttonheads - Complete / Partial Uncoated % Anchorhead - Complete / Partial Uncoated % Shims - Complete / Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete / Partial Uncoated % ⁽¹⁾ - Limited within the Inside diameter of the grease cap. | <u>10).10-20-10</u> |
| 6) Unusual Conditions: | 71.8.10-2010 |
| 3.7) Grease Color Match: Extes INO Grease Color: <u>Brown</u> Comments: <u>None</u> | 14.10-20-10 |
| 3.8) Quantity of Samples Quart Sample's Identified per Step 8.8.1? X Yes INO Location of A.H. B.P. & Shims Cap Duct Removal | US. 10-2 0.1 |
| 9.9) Qly. of Grease lost during removal of cap: 20 gal. | 7.1. 10.20.10 |
| 3.9.1) Grease from cap to be reused? S Yes No Qly. of Grease removed from cap: O gal. | 2.1 \$ 12-1010 |
|).6) Qty. of Grease removed from anchorage: / gal. | 7-08.10-20-10 |
|) 7) Damage during cap removal or anchorage cleaning? 🔲 Yes 🖾 No Describe: <u>//A</u> | 24\$ 12:0-12 |
| 0.3) Method of Tendon Protection: Installed Can with new gasket | 1.13.10-20-10 |
| 0.4) Amount of Grease Loss from Tendon duct: 28 gal. | + |
| | 710.10-20.10 |
| 0.5) Total guantity of lost grease (below): | |
| $(8.8) \cdot 5 + (8.9) \circ 0 + (8.9.1) \circ + (9.6) + (10.4) \circ 0 = 1.5 \text{ TOTAL}$ | 7100.10-20-10 |
| 1.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. Yes No | 7.02 102010 |
| | |

IS SQ 6.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 60 of 523

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| RSC Solution | PSC PROCEDURE SQ 6.1 INSPECT FOR WATER Data Sheet 6.1 July 31, 2009 Page 1 of 1 Revision 0 |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (8.1) Tendon No.: <u>H 46-41</u> Tendon End: <u>Butt. 6</u> 🛛 S | Shop 🗍 Field |
| (9.5.1) DURING REMOVAL OF GREASE CAP Water Detected: Yes X No Quantity: Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: NonC | □ Yês □ No ⊠ N/A XNot Applicable |
| (9.6.1) INSIDE GREASE CAP Water Detected: Yes X No Quantity: O Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: None | X Not Applicable |
| (9.7.1) AROUND TENDON ANCHORAGE COMPONENTS Water Detected: Yes SNo Quantity: O Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: NonC | Yes No X N/A |
| | |
| Water Detected: Yes No Quantity: Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: Comments: Significant Moisture | Yes No NA |
| (11.1) NOTIFICATION N/A Exelon Notified: Yes No Individual Name; | Date: |
| SAMPLE IDENTIFICATION AND STORAGE N/A (12:2) Samples adequately identified: Yes No (12:3) Samples stored at: | |
| QC Signoff: W. Joince Pallin Level: II- | Date: <u>10-20-10</u> Date: <u>10-20-10</u> |
| QC Reviewed: Dring C. Dot Level: | Date: 10-20-10 |

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| RSG | PSC PROCEDURE SQ 6.1 INSPECT FOR WATER Data Sheet 6.1 July 31, 2009 Page 1 of 1 Revision 0 |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (8.1) Tendon No.: <u>H Y6-Y/</u> Tendon End: <u>Butt Y</u> | Shop 🕅 Field |
| (9.5.1) DURING REMOVAL OF GREASE CAP Water Detected: Yes Yes Sample Taken Moisture Description: Observable Moisture Comments: NonQ | |
| (9.6.1) INSIDE GREASE CAP Water Detected: Yes Strive Quantity: O Sample Taker Moisture Description: Observable Moisture Significant Moisture Comments: Mone | |
| (9.7.1) AROUND TENDON ANCHORAGE COMPONENTS Water Detected: Yes XNo Quantity: <u>O</u> Sample Taker Moisture Description: Observable Moisture Significant Moisture Comments: <u>None</u> | |
| (9.9.1) DURING DETENSIONING Water Detected: Yes No Quantity: Sample Taken Moisture Description: Observable Moisture Comments: | n: Yes No N/A Not Applicable |
| (11.1) NOTIFICATION Exelon Notified: Yes No Individual Name | Date: |
| SAMPLE IDENTIFICATION AND STORAGE (12.2) Samples adequately identified: Yes No (12.3) Samples stored at: | · |
| QC Signoff: Timer L. DAta Level: TL QC Reviewed: W, Chuce Roblem Level: TT | Date: <u>10-20-10</u> Date: <u>10-28-10</u> |
| | 16 ROACHITREAD |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

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| | Page 1 of 1 | |
|--|--|--|
| Station: TMI Unit: | Date: 10 - 20 - 2010 Report No: | |
| WO No(s) .: R2139507 | Tendon Anchorage No.: H46-41 Tendon End: K Shop TF | ield |
| Location: Tunnel, Gallery, Buttress | Elevation: 294'11" Bearing Plate I.D. UNADE | a locat |
| Bearing Plate LD. | Anchor Head I.D. 909 Bushing I.D. ABSW5 | |
| Exam Type: X DV XVT-1 | Type Of Exam: XDirect Remote | |
| 🗙 As Found Exam | As Left Exam Following Retensioning Of Tendons Which Have Been Detention | oned |
| Design Drawing(s) TMIL 1-0015 | Visual Aids: NONE | |
| | Test Card UTC or Serial No. N/A Cal. Due Date: N/A | |
| Illumination Used Flashlight | Illumination Verified: Date: 10-20-2010 Time: 073 | 0 |
| Special / Specific Instructions: | | |
| Component / Item Number and | RESULTS Explanation / Notes | |
| Description | NI RI TYPE IO (Sketch Shall Be Attached Depicting Location O Missing, Protruding, Unseated Wires) | |
| H 464 1 Tendon Anchorage component At buttress 6. Shop End. | SV NO indications | |
| Results Legend: NI - No Inc A. Missing Wires | dications RI - Recordable Indication IO – Information Only Recordable Indication Type Codes: H. Cracks O. Other (Exp | |
| B. Missing Button Heads | I. Pitting | <u>,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| C. Protruding / Unseated Wires | J. Nicks, Gouges, Mechanical Damage | |
| D. Broken Wires E. Active Corrosion | K. Uneven Shim Stack L. Excessive Shim Gaps | |
| F. Other Corrosion | M. Gasket Seating Surface Damage | |
| G. Evidence Of Free Water (Quantif | y) N. Surface Discontinuities, Deflections | |
| Supplemental Information : Yes | No Sketch XPhoto Video Other (Describe): | - <u></u> |
| | Results: Acceptable Yes No | <u> </u> |
| EXAMINER/EVALUATOR | Kance Kollen LEVEL II DATE 10-20 | -0 |
| (Print & Sign) W. RANCE Robbins-W. STATION/ADMIN REVIEW | | 1-10 |
| (Print & Sign) | Tohum DATE 10/22/2010 | |
| | ed only if Examiner/Evaluator notes RI or Unacceptable condition. | |
| RI or Unacceptable results Accept | | |
| Additional Actions: | | |
| (Action Request, Work Order, Issue Report, etc | c. initiated for Corrective Action) | |
| LEVEL III or RI REVIEW (as applicab | | |
| ANII REVIEW (as applicable) | Jacob Sthalty DATE: 114-10 | |
| J | Page (of) | |

ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report

| Page 1 of 1 | | | | | |
|---|-----------------------------|--|---------------------------------------|---|--|
| Station: TMI Unit: | | 0-20-10 | · · · · · · · · · · · · · · · · · · · | 4 | |
| WO NO(S) .: R2139507 | Tendon Ancl | norage No.: A y | 6-4/ Tendon End: | Shop K Field | |
| Location: Tunnel, Gallery Buttress | | Elevation: | | Diyable To locate | |
| Bearing Plate I.D. Unable To locate | Anchor Head I.D. | 971 | Bushing I.D. | | |
| Exam Type: DV XVT-1 | | | | Remote | |
| As Found Exam | | and the second | g Of Tendons Which Have | Been Detentioned | |
| Design Drawing(s)TMI 1-0016 | Visu | al Aids: None | 1 | | |
| M&TE Used steel full R-LEG-18-11 | | · · · · · · · · · · · · · · · · · · · | A Cal. Due | | |
| Illumination Used Flash Jigh+ Special / Specific Instructions: 1 | | ination Verified: | Date: 10-20-10 | Time: g:00 A.M. | |
| Component / Item Number and | RESULTS | | Explanation / Note | | |
| Description | NI RI TYPE | IO (Sketch | Shall Be Attached Depiction | | |
| | | | Missing, Protruding, Unsea | | |
| H-46-41 Tendon Anchorage | 1.4 1.4 | B 2 Miss | ing button Heads | | |
| | 7.03 | Seel |)ata sheet 4 | | |
| | | Enclou | sure 6 | | |
| Previously Reported | | | | | |
| | •. | | 0 1 | | |
| Results Legend: | | <u>F</u> | | 1829 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - 1939 - | |
| NI - No Inc | | | 0 – Information Only | | |
| A. Missing Wires | Hecordable in | dication Type Code Cracks | <u>o</u> | Other (Explain) | |
| B. Missing Button Heads | 1. | Pitting | 0 | | |
| C. Protruding / Unseated Wires | , J. | | lechanical Damage | | |
| D. Broken Wires E. Active Corrosion | К. Ц. | Uneven Shim Sta Excessive Shim (| | | |
| F. Other Corrosion | M. | Gasket Seating S | | | |
| G. Evidence Of Free Water (Quantil | | Surface Discontin | uities, Deflections | | |
| Supplemental Information : XYes | | Photo Vide | eo 🗌 Other (Describe): | | |
| | Results: Acceptal | ole Ares | No | | |
| EXAMINER/EVALUATOR | 1 Cont | | LEVEL IF D | ATE ID-20-1D | |
| (Print & Sign) Tinot Ly C. Gibson (1000) STATION/ADMIN REVIEW | Y | | | ATE 10-20-10 | |
| (Print & Sign) | a Vohoon | h | DATE | 0/29/2010 | |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | | | | | |
| RI or Unacceptable results Accept | table 🗌 Yes [| No | • | | |
| Additional Actions: | | | | | |
| (Action Request, Work Order, Issue Report, et | c. initiated for Corrective | Action) | | | |
| LEVEL III or RI REVIEW (as applicat | ole) | | DATE: | | |
| ANII REVIEW (as applicable) | uph 1 Shelly | | DATE: // | - 4-10 | |
| | Page | _of | | | |

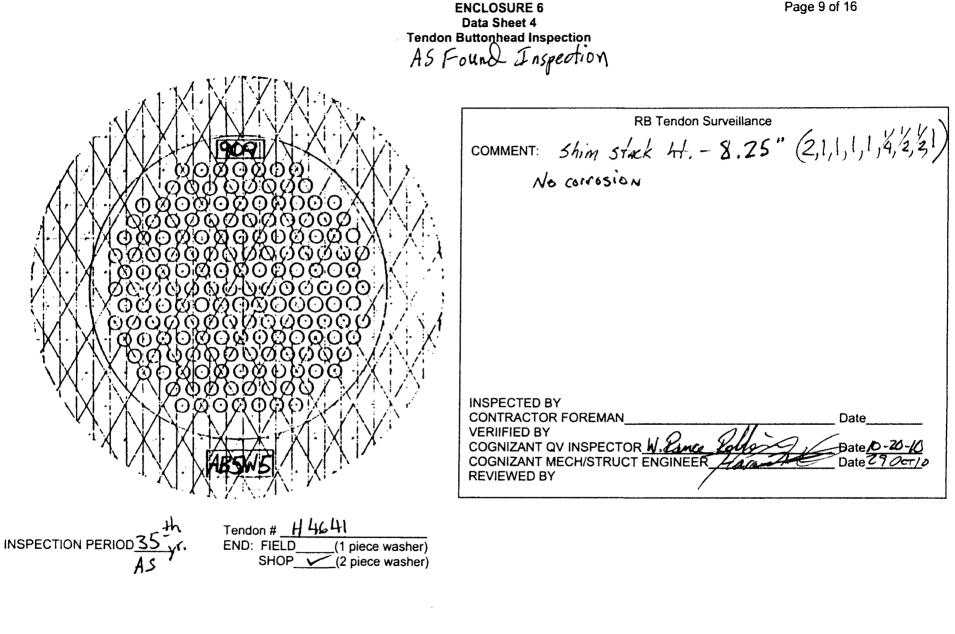
ER-AA-335-018 Revision 5 Page 32 of 32

ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Station: Unit: Date: Report No: 10 - 20 - 20 | 0MAinmer Eomponent: 2 System. WO No(s) .: R 2139507 Area of concrete Around Building: Containment Elev .: 294'11" Col.: N/A Azimuth/Radius: At / Location: Row: N/A Type Of Exam: Direct Exam Type: DV DV VVT-1C VT-3C Remote Matl. Type: Concrede Visual Aids: None Design Drawing(s) TMI 1-0015 Surface / Components Coated: Surface: ID (OD YES X NO 7 Test Card M&TE Used: Nowe UTC or Serial No. N/4 Cal. Due Date:NA Illumination Verified: Illumination Used Flashlich Date: 10-20-10 Time: 0730 Special / Specific Instructions: RESULTS Component / Item Number and **Explanation / Notes** Description **RI TYPE** (As a minimum, Record Location and Size of 10 NI (e.g. EIN, EID, etc.) Recordable Indications as applicable) 2'area of concrete No indications Around H46-41 tendon, SHOP/BTG END THE Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only **Recordable Indication Type Codes:** Cracks (Characterize and Size) Α. G. Settlements Or Deflections Scaling / Dusting Μ. Β. Exposed Reinforcing Steel **Degraded Patches or Repairs Coating Deterioration** H. N. C. Exposed Metallic Items (Other) Popouts, Voids, Honeycomb 0. Abrasion, Cavitation, Wear I. D. Evidence Of Grease Leakage Spalls Air Voids / Bug Holes J. P. Evidence Of Moisture Cold Joint Lines E. K. Q. Efflorescence F. Leaching Or Chemical Attack L. **Corrosion Staining** R. Other (Explain) Supplemental Information : Yes XNo Sketch Photo Video Other (Describe): Results: Acceptable XYes EXAMINER/EVALUATOR (Print & Sign) W. RANCE RODDIN Jance DATE 10-20-2010 Π LEVEL STATION/ADMIN REVIEW 214111 DATE (Print & Sign) ~5 am 0 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable **Yes No** Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) DATE: DATE: 2/9/11 ANII REVIEW (as applicable) Page _ of I

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ER-AA-335-018 Revision 5 Page 32 of 32

| ATTACHMENT ASME IWE (Class CC) Containment Concrete VT-1 Report | |
|---|--|
| Page 1 of 1 | |
| Station: TMI Unit: I Date: 10-20- | |
| System: Tendon's Component: H46-41 24" around anchor y | ate, concrete, WO NO(S): R 2/39507 |
| Location: Building: containment Elev.: 294 -11" Col. | 1/4 Row: 1/4 Azimuth/Radius: 1/4 |
| Exam Type: DV DGV SVT-1C VT-3C Type Of Exam | n: Direct Remote Matl. Type: Concrete |
| Design Drawing(s) Tmr 1-00/6 Visual Aids: | |
| Surface: ID (OD) Surface / Cor | nponents Coated: YES NO |
| M&TE Used Steel Rale Area -17 Detest Card UTC or Seria | |
| Special / Specific Instructions: */4 | on Verified: Date: 10-20-10 Time: 8:00 4A |
| Component / Item Number and RESULTS | Explanation / Notes |
| Description NI RI TYPE IO | (As a minimum, Record Location and Size of |
| (e.g. EIN, EID, etc.) | Recordable Indications as applicable) |
| (e.g. EIN, EID, elc.) Concrete 24" around anchor plate at tendon H 46-41. Butt. 4/Field, | No indications |
| anchor plate at tendon V | NO MATCHINGS |
| HUL-41 Butty/Field, | |
| 11 10 11. 8000 11 12 | |
| | |
| | |
| | |
| | L <u></u> |
| Results Lege NI - No Indications RI - Recordable In | nd: dication IO – Information Only |
| Recordable Indication | Type Codes: |
| A. Cracks (Characterize and Size) G. Settlements Or Deflection B. Exposed Reinforcing Steel H. Degraded Patches or R | · · · · · · · · · · · · · · · · · · · |
| C. Exposed Metallic Items (Other) I. Popouts , Voids, Honey | |
| D. Evidence Of Grease Leakage J. Spalls | P. Air Voids / Bug Holes |
| E. Evidence Of Moisture K. Cold Joint Lines F. Leaching Or Chemical Attack L. Corrosion Staining. | Q. Efflorescence R. Other (Explain) |
| Supplemental Information : XYes No Sketch Photo | Video 🗌 Other (Describe): |
| | XYes No |
| (Print & Sign) Time C. Man | LEVEL # DATE 10-20-10 |
| (Print & Sign) Timoly 6 Gilson Min C. C. Mar STATION/ADMIN REVIEW - Dry (| |
| (Print & Sign) Evan Johnson M | DATE 19/29/2010 |
| This section to be completed only if Examiner/Eva | luator notes RI or Unacceptable condition. |
| RI or Unacceptable results Acceptable Yes No | |
| Additional Actions: | |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | |
| LEVEL III or RE REVIEW (as applicable) | DATE: |
| ANII REVIEW (as applicable) Joseph Shelly | DATE: 11-4-10 |
| Page 1 of 1 | |



Missing Button head Missing Button Head Tendon Buttonhead Inspection AS Found Inspection 1301-9.1 **Revision 21** Page 9 of 16 **RB** Tendon Surveillance COMMENT: Shim Stack Hieght 9.3" No Corrosion Noted. Missing wives Previously Reported OOOOOOഗരഗ **INSPECTED BY** CONTRACTOR FOREMAN Date VERIIFIED BY COGNIZANT QV INSPECTOR Date 10 - 20 - 1 COGNIZANT MECH/STRUCT ENGINEER , **REVIEWED BY** Tendon # __H _ Y6 - Y1 END: FIELD ____ (1 piece washer) SHOP_____(2 piece washer) INSPECTION PERIOD <u>35</u> ^{yr.} AS

Topical Report 204 Revion 0 Attachment 8.7 Page 68 of 523

PSC PROCEDURE SO 7.1 INSPECTION DOCUMENTATION DATA SHEET 7.1 July 31, 2009 Page 1 of 1 Revision 0

| | · · · · · · · · · · · · · · · · · · · | 4641 | TENDON | | Tendon E | nd/Buttr | 988 No.: | But | 4.6 | | |
|------|---------------------------------------|-----------|-----------------|-------------------|-------------------|----------------|---------------------------------|----------------|----------------|---------|------------|
| | | 1 | <u> 185w</u> | | | | C 6002 | - | | | |
| | EQUIPMENT | | MICRO | METER | j. | | ŴIR | E | 1 ² | SHIM | //S |
| | Thread | Mi | c ID | Reca | Date | | D No. | Recal Da | te 1 | D No. | Recal Date |
| | Ext. Májór | QC | -38 | 4-5 | 5-11 | | | | | | |
| | Ext. Pitch | 1 | -38 | 4-5 | | Set | #=16 | 6-25-1 | I Si | RID | 12-25-10 |
| | Ext. Minor | | -38 | 4-5 | | • | Set | 12-25-1 | | | 2-25-10 |
| | Int. Májor | | I/A | | IA | | | | | | |
| | lnt. Minor | Ň | I/A | Ň | /A | | | | | | |
| [| MEASUREME | NTS | ſ | THREAD |) | | | Wire | Wire | Shim | Average |
| 3 | Thread | Read | 3rd | 6 th | 9 th | A | vəragə | Constant | Diameter | | Diamotor |
| | Ext. Major | 1 2 | 9.367 9.368 | 9.372 9.370 | | | | | | | 9.371 |
| | Ext. Pitch (1) | 1 2 | 9.545 | | 9.555 | a | .548 | .254 | | .032 | *** |
| } | Ext. | 1 | 9.468 | 1999年2 1919年1月 | 9.468 | | | | | | |
| | Minor (2) Int | 2 | 9.463 N/A | 高的同时 1218-2519 | 9.470 N/A | 9 | 467 23.2000/2000 | | .120 | ,032 | 2 9,195 |
| | Major | 2 | N/A | | N/A | | | | | | |
| | Int. Minor | 1 | N/A N/A | N/A N/A | <u>N/A</u> N/A | | | | | | |
| ľ | Int. | ····· | Gauge ID: | Ň | /A | (FATE: DITE: A | Recal Dat | te: <u>N/A</u> | <u> </u> | Result: | N/A |
| | Pitch | No-C | Go Gauge D: | Ň/ | A | | Recal Dal | te: N/A | N | Result: | N/A |
| Note | | Minor Dia | | | | |] – (Shim Siz neter] – (Shin | | | | |
| | | | | | Adaptoi | Mark | Trial 1 CGOUZ | Trial 2 | Trial 3 | Trial | 4 |
| | | Min. N | linor Dian | | Adaptor | Table | 8,619 | | | | |
| •• | Signoff: | Λ | A D | cceptabl | e? (Yes (| | | | Date | 10-20 | <u> </u> |

RSG

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| | | | | | | INSPECT | P | HEE / 31. age |
|----------|-------------------|--|--|---|--|--|--|---------------------|
| 9 | | st. Status and a status and a status | n an | in a start with a st | - - | · · · · · | ,. F | Revi |
| Pro | ject: TMI - 3 | | I SURVEILLANCE | | an a | | n - Courte Herrich - Courte - | 2.4 2.4 2.4 |
| | | 46-41 | | nd/Buttress No.: | <u>_Fj</u> | 10 /B | H 11 | |
| | chorage ID:: | <u>9</u> | Adaptor I | A | 6-600 | y arrest | | |
| Ω'n | | The Milling Defined and the second second Second second | | 1.65-10-10 | 10 | | | |
| i T | EQUIPMENT | MICRO | METER | WI | RE | | SHIMS | |
| | Thread | MicID | Recal Date | ID No. | Recal Da | te IDN | lo: Recal | Dal |
| 17. | Ext. Major | QL-52 | 4-5-11 | | | | | |
| | Ext. | | 4-5-11 | Set | | | | <u>76197</u> |
| - | Pitch Ext | QC-52 | | | 6-25-11 | <u> Sur </u> | 12-25 | <u>70</u> |
| | Minor Int | Q6-52 | 4-5-11 | Drk/Blue | 12-25-1 | 0 Sur 3 | 12.25 | -10 |
| • | Major | N/A | N/A | | | | | |
| | Int. Minor | N/A | N/A | | | | | |
| | 1 | | 12 (120) / (20) | T | ····· | ······································ | Service of the Street Adjustic Marcine and the service of the serv | |
| | MEASUREME | 43. · · · · · · · · · · · · · · · · · · · | THREAD | Average | Wire Constant | Wire Diameter | | vera |
| J | Thread Ext | Read 3 rd | | | | | | ame |
| , | Major | 2 9.369 | 9.373 9.372 | | | | 9. | 37/ |
| | Ext. Pitch (1) | 1 9.527 | 9.528 | 9.527 | ,254 | | .032 9. | 3 4 |
| - | Ext: | 1 9.456 | 9.457 | | | | 8 T 1 4 | · · · · · |
| | Minor (2) Int. | 2 9.457 1 N/A | 9:458 N/A | 9.457 | | .240 | 1032 9.1 | 185 |
| | Major | 2 N/A | N/A | | | | | |
| | Int. Minor | 1 N/A 2 N/A | N/A N/A N/A N/A | | | | | |
| | Int. | Go Gauge ID | | Decel C | | | | |
| | Pitch | No-Go Gauge | | Recal D Recal D | | | esult: <u>N/A</u> | |
| • | | ID | 1 m · · · · · | Νοζαίζς | /dio | | esuit. N/A | |
| No | tes: (1) External | Pitch Diameter = | (Average) - (Wire | Constant] - (Shim S Wire Diameter) - [Sh | lize] | · · · · · · · · · · · · · · · · · · · | <u> </u> | |
| | DISPOSIT | IQN | | ănite Manuateri - 19ì | iin Sizal | | | |
| | | | • | Trial 1. | Trial 2 | Trial 3 | Trial 4 | |
| • | | Min. Minor Dia | Adapto meter from Adaptor | | 6-631 | 6-6002 | · · · · | |
| | | | Acceptable? (Yes | X | Yes | Yes | · · · · · · · · · · · · · · · · · · · | |
| | Signoff: | longy / | Sta | Level: | I | | 0-20-10 | |
| A | Reviewed: | 100 AL | ¥~ | Level: | Ŧ | | 11-11 | |

19 SQ 7 1: TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 70 of 523

| | .1 | | | DATA SH Lift-Off Force № | | | 1301-9.1 Revision 21 Page 1 of 1 |
|---|---|--|---|--|---|--|--|
| Surveillance | No. 35 th. | Tendon ID <u>H44</u> | -41 Prec | licted Force (Fp)_ | <u>1314</u> kip | Tendon End (Ci | rcle One): Shop / Field |
| Phase (Circl | e One): As-found / | Re-Tension | Ram ID | 002 | Ram Calibrat | tion Constants: A = <u>/9</u> | 1.381 k= -8.275 |
| Date 10-20 | -10 Temp: F | RB Interior <u>111 </u> | - / Concrete Surfac | ≈ <u>_56_</u> ⁰F | No. Effective | Wires, N. 169 | Shim Stack Ht. 8.25 in. |
| | | DO NOT EXCEEP A F | AM PRESSURE (| CAUTION DF [(1,592 x N _w / 1 | 169) – k] x 1,00/ | D/A = <u>8361.72</u> ps | sig |
| Trial 1 2 3 4 5 6 7 8 9 10 | Lift-Off Pressure, psig | Consecutive Three Trial Pressure Spread psi N/A D | Consecutive Three Trial Pressure Average p ¹ psig ^{1,2} N/A N/A 7060 | At Feeler Ga | At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | ner Rotation Rotation, Turns CW or CCW 0 0 0 0 1,000) = k = <u>1342.57</u> k | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead |
| ² Re-tension For Re-Tens Notes: <u>/</u> | P range: $P'_{min} = (F_p \le 0)$ sion Only: $F_p \le End$ | Lift-Off Force < 1394 | <u> </u> | sta < N | /*_ < _^ | 00/A = <u>N/A</u> psig Yes/N <u>Terme Cort</u> QV | o (Circle One) |

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| | | | | | DATA S Lift-Off Force | | | 1301-9,1 Revision 21 Page 1 of 1 |
|--|---|--|--|--|---|---|---|--|
| | Surveillance No | <u>35 ×c.</u> | Tendon ID <u>// 46-4/</u> | _ Predi | icted Force (F _p) | <u>1314</u> _kip | Tendon End (C | Fircle One): Shop / Field |
| | Phase (Circle O | ne): As-found / | Re-Tension | Ram ID <u>600</u> | <u>9</u> | Ram Calibrat | ion Constants: $A = \underline{P}$ | 1.18/ k= -8.352 |
| | Date 10-20-10 | Temp: F | RB Interior _///°F/ | Concrete Surfac | æ <u>_52</u> .°F | No. Effective | Wires, N <u>w / 67</u> | Shim Stack Ht. <u>9.3</u> in. |
| | | | DO NOT EXCEEP A RA | M PRESSURE C | CAUTION DF [(1,592 x Nw/ | (169) – k] x 1,000 | | osig |
| Topical Report 20 Attachment 8.7 P | ² Re-tension P For Re-Tensio Notes: <u>Non</u> | Lift-Off Pressure, psig <u>7220</u> 7200 7200 7200 ressure spread > range: P ² _{min} = (F n Only: F _p < End | Consecutive Three Trial Pressure Spread psi | Consecutive Three Trial Pressure Average p' psig ^{1,2} N/A 7/2/3.37 | At Feeler G End Lift-Off $nox = [(1,394 \times N)]$ $\frac{10}{10}$ / Review | Stressing Wast age Insertion At Trial 1 At Trial 2 At Trial 3 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum Force = (A x P' / | $\frac{16.10-23-60}{\text{her Rotation}}$ Rotation, Turns CW or CCW 0 0 1,000) = k = <u>1370.69</u> 1,000/A = <u>M/L</u> ps MA Yes / 1 | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead |
| al Report 204 Revion 0 hment 8.7 Page 72 of 523 | | | | | 29 | | - - | and a second |

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|---------------------------------------|---------------------------------------|------------------|---------------|---|--|------------------|
| Project: Ti | 1 35 TH YEAR TENDON SI | JRVEILLANCE | · | | žena ana konstantina i ana izvista i sa se | |
| Tendon No.: | <u>H46-41</u> | Tendon End: | Buttress | 6 Shop | Field | |
| · · · · · · · · · · · · · · · · · · · | | ANCHORAGE INS | PECTION CRITE | RIA | | |
| | BEARING PLATE SURF | ACE PROPERLY F | REPARED: | X YES | | |
| | GREASE CAP SURFAC | | , | YES | | |
| | GASKET MATING SURF | ACE PROPERLY | PREPARED: | YES | | |
| | STUD/BOLT HOLES PR | OPERLY PREPAR | ED: | TAVES | | |
| | FOREIGN MATERIAL EX | CLUSION CONTR | OLLED: | YES | | |
| | COMMENTS | | ······ | | | |
| | | | | | | |
| | | | | ····· | | |
| | · · · · · · · · · · · · · · · · · · · | | | **** <u>*</u> ******************************* | | |
| | | 77 1 1 | 10 | | ***** | i di gara di e e |
| *********** | | Lafrance 1 p. 1. | 11/2 | | 10 00 | in |
| CREW FORE | MAN SIGNOFF | h ll [l] | MJ | | Date: 10-20- | <u>-10</u> |

| RSG Solo | <u>چ</u> . | | | PSC PROCEDURE SQ 12.0 REPLACE GREASE CAP Data Shoot 12.0 July 31, 2009 Page 1 of 1 Revision 0 |
|-------------|---------------------------------|---------------------------|---|--|
| Project: TN | 11:35 TH YEAR TENDON | SURVEILLANCE | e nachargant an Anachor atha taman ann a suit an an | |
| Tendon No. | <u>H 46-41</u> | Tendon End: Butt. 4 | Shop | Field |
| | | ANCHORAGE INSPECTION CRIT | ERIA | |
| | BEARING PLATE SUF | RFACE PROPERLY PREPARED: | YES | |
| | GREASE CAP SURFA | CE PROPERLY PREPARED: | YES | NO |
| | GASKET MATING SU | RFACE PROPERLY PREPARED: | YES | |
| | STUD/BOLT HOLES F | ROPERLY PREPARED | T YES | |
| | FOREIGN MATERIAL | EXCLUSION CONTROLLED: | YES | |
| | COMMENTS Non | <u>e</u> | | |
| | | | | |
| | . | | | |
| | MAN SIGNOFF | 16/11/02 | e hag a syna ddi a berli'n dallerdd yn arw | Date: <u>10-20-1</u> 0 |
| UNEWFURE | | 1 1 | | |
| QC Reviewe | d: /imad | Level: | Ŧ_ | Date: 102870 |

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PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT Data Sheet 12.1b – Hand Pumping July 31, 2009 Page 1 of 1 Revision 0

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| Project: TMI 35 th YEAR TENDON SURVEILLANCE | Tendon No.: <u>//</u> | <u> 46-4/</u> |
|---|--|----------------|
| GREASE REPLACEMENT | | QC SIGNOFFS |
| (8.4) Grease Used A-NEW OLD - TEST DATE: ACCEPTABLE | DATED: | 163,10-11-10 |
| (8.5) Total Grease Loss from Data Sheet 6.0 for Butt. 4/ Field tendon end: | 1.5 gal. | 7.1 10-21- 10 |
| (8.6) Total Grease Loss from Data Sheet 6.0 for Bit. 6/ Shop tendon end: | .75 gal. | 7.05.10-21-10 |
| (8.7) Estimated grease losses from leaks for But 4/ Field tendon end: | Ø gal. | 7.19.10-2410 |
| (8.8) Estimated grease losses from leaks for Bitt, 6 / Shop tendon end: | 🔿 gal. | 7.13.10-21-10 |
| (8.9) TOTAL Tendon Grease Loss: | 2.25 gal. | 7.03.10.2100 |
| 13.0 POURING AND HAND PUMPING - FIRST END | ······································ | |
| (13.6) Ambient Temp.: 65 °F Thermometer ID: 9k-103 Recal Date | : <u>6-23-11</u> | |
| (13.7) Grease Temp.: <u>220 °F</u> Thermometer ID: アルール3 Recal Date | a: 6-23-1/ | |
| (13.9) Initial Grease Height (a) 80,75 in. (13.12) Final Grease Height (b |) 19.25 in. | |
| (13.14) Total amount of Grease added: $2,65$ gal. $(a-b) \times 1.77$ into the | e Field end | |
| 3.16) Quantity of Waste Grease: O gal. (13.15) X Poured | Hand Pumped | |
| (13.17) Total Grease <u>Replaced</u> this end: 2,65 gal. | | 7.15 10.11.10 |
| 13.0 HAND PUMPING SECOND END | 201111212122120222000000 | |
| (13.6) Ambient Temp.: 65 °F Thermometer ID: 9k ~103 Recal Date | 6-23-11 | р. В. В. |
| (13.7) Grease Temp:: <u>220 °F</u> Thermometer ID: <u>ρβ-)o3</u> Recal Date | 6-23-11 | 0 0" 0: |
| (13.9) Initial Grease Height (a) in (13.12) Final Grease Height (b |) /8 in: | |
| (13.14) Total amount of Grease added: 2,2] gal. (a - b) × 1.77 into the | e Shop end | |
| (13.16) Quantity of Waste Grease: Ø gal. (13.15) Poured | Hand Pumped | |
| (13.17) Total Grease Replaced this end: 2,2/ gal. | | 7.03. 1021.10 |
| 14.0 CALCULATION OF PRESSURE PUMPING | ***** | 1 |
| (14.1) Total Tendón Grease Replaced: <u>4,86</u> gal. (13.17 + 13.17) | | |
| (14.2) Net Tendon Duct Grease Volume: 114.86 gal. Relatio SQ 12.2 - GREASE VOLUME | res, for the Tendon Nel Duct Volume | |
| (14.3) Percent Difference: Total Tendon Replaced (14.1) - Total Tendon Loss (8.9) Net Tendon Duct Grease Volume (14.2) | = <u>2.27</u> % Difference | Out water |
| (14.4) Grease Leaks: Yes No | | Till berio |
| 14.5) Refill Acceptable: R: Yes (loss than 10%) INO (greater than 10%) | 1. | 7.03.10-2010 |
| If No – Customer Notified NCR No.: | <u>A</u> | 714 botio |
| (14.6) Comments None | | |
| Reviewed: W. Pano Poblem Level: II | Date: 10-2 | 8-10 |
| VY Fame Lever | | v |
| | | |

| | CEDURE SQ 6.0 CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (7.2) Tendon No.: V-117 Tendon End: Shop Top X Shop | Field |
| Grease Cap Removal | ······ |
| (7.5)Date Removal Started: 10-25-2010 | Q.C. Signoff |
| (7.6) Dry Ice Used on Grease Cap and/or Anchorage | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| (7.7) Temp. of Concrete: 59 °F Thermometer No.: 57-742 Re-Cal Date: 6-23-11 | |
| Amblent Temp.: 63 °F Thermometer No.: PK 102 Re-Cel Date: 2-9-11 | WPR 10.75-10 |
| (8.4) Anchorhead I.D. : 812/581 Anchorhead Verification: Anchorhead Verification: | WPP 10-25-10 |
| | |
| (8.6) Grease Coaling Grease Cap - Complete / Partial Uncoated % | |
| Grease Cap - Complete V Partial Uncoated % Buttonheads - Complete V Partial Uncoated % | |
| Anchorhead - Complete / Partial Uncoated % | |
| Shims - Complete Partial Uncoaled % | |
| Bearing Plate - (1) Complete / Partial Uncoated % | WRR 10-2510 |
| De) Unusual Conditions: Nove | <u>WERB-25-10</u> |
| (8.7) Grease Color Match: XYes INO Grease Color: Medium Brows Comments: Alose | NER DES-TO |
| (8.8) Quantily of Samples O Quart Samples Identified per Step 8.8.17. Yes N/A No | |
| Location of A.H. B.P. Shims Cap Duct Removal Note: No SAMPLES TAKEN PEL. TMI ENGINEERING. | WERD-25-D |
| (8.9) Qly, of Grease lost during removal of cap: | NER D-25-D |
| (8.9.1) Grease from cap to be reused? Yes No Qly, of Grease removed from cap: Sgal. | WPP 10-25-12 |
| (9.6) Qty. of Grease removed from anchorage: 2, 5 gal. | WRE D.25.10 |
| (9.7) Damage during cap removal or anchorage cleaning? Tyes PNO Describe: NoNC | WER A. 25-A |
| (10.3) Method of Tendon Protection: Reinstalled the grase cap w/4 New gasket | NRZ D-25-17 |
| (10.4) Amount of Grease Loss from Tendon duct: O gal. | 1x P. 10-25-10 |
| (10.5) Total quantity of lost grease (below): (8.8) \bigcirc + (8.9) \bigcirc + (8.9.1) \bigcirc 5 + (9.6) \bigcirc 5 + (10.4) \bigcirc = 3 TOTAL (11.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. Yes \Box No C Reviewed: \Box | NRR 10-25-11 WRR 10-25-11 |

¹⁵ Sopral Report 2049 Revion 0 Attachment 8.7 Page 76 of 523

| | CEDURE SO 6.0 CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (7.2) Tendon No.: 1-117 Tendon End: 30Hom Shop | Field |
| Grease Cap Removal | |
| (7.5)Date Removal Started: 10-26-10 | Q.C. Signoff |
| (7.6) Dry Ice Used on Grease Cap and/or Anchorage | - Farris A afrikanser 1 |
| (7.7) Temp. of Concrete: 86 °F Thermometer No.: 5T - 78 Re-Cal Date: 6-23-4 | |
| Ambient Temp.: 80 °F Thermometer No.: 0k-103 Re-Cal Dale: 6-23-11 | 70/10-2640 |
| (8.4) Anchorhead I.D. : <u>739</u> Anchorhead Verification: Amatch No-Match | 7.00 10-26-10 |
| (8.5) Grease Coaling Grease Cap Complete Partial Uncoaled % Buttonheads Complete Partial Uncoaled % Anchorhead Complete Partial Uncoaled % Shims Complete Partial Uncoaled % Bearing Plate – (1) Complete Partial Uncoaled % (1) - Limited within the inside diameter of the grease cap. | <u>11810-26-112</u> |
| B) Unusual Conditions: NOR | 718 10-26-10 |
| (8.7) Grease Color Match: XYes INO Grease Color: <u>Brown</u> Comments: | 700.1026-10 |
| (8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? TYes A Do. Location of A.H. B.P. Shims D.Cap Duct | 745 10-26-10 |
| Location of A.H. DB.P. DShims Dcap Duct Removal NOTE: No Samples Taken Per. TMS Engineering. | |
| (8.9) Qly. of Grease lost during removal of cap: O gal. | 718.10-26-10 |
| (8.9.1) Grease from cap to be reused? Xes No Qiy. of Grease removed from cap: 5 gal. | 1.10.10-26-D |
| (9.6) Qly of Grease removed from anchorage: | 7.03.10.26.00 |
| (9.7) Damage during cap removal or anchorage cleaning? 🔲 Yes 🖄 No Describe: | 108.026-10 |
| (10.3) Method of Tendon Protection: Install can with new gastet | 200.1026-10 |
| (10:4) Amount of Grease Loss from Tendon duct: gal. | 70510-26-10 |
| (10.5) Total quantity of lost grease (below): (8.8) O + (8.9) O + (8.9.1) + 5 + (9.6) . 5 + (10.4) O = TOTAL | 424 10260 |
| (11, 1, 2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. Yes INO | 7.1.J. 10-26-10 JUS-10-26-10 |
| De Reviewed: W. Rame Rabber Level: II Date: | 0-28-D |

| Pre | oject: TMI 35 TH YEAR TENDON SURVEILLANCE | anan kalendar yang dan kalendar kalendar kalendar kalendar kalendar kalendar kalendar kalendar kalendar kalend Kalendar | |
|--------|---|--|----------|
| (8) | 1) Tendon No: <u>V-117</u> Tendon End: <u>Vop</u> XIS | nop 🔲 I | Fleid |
| 9. | 5.1) DURING REMOVAL OF GREASE CAP Water Detected: Yes X No Quantity: Complex Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: Nove | | (Ž N/A |
| 9.(| 6.1) INSIDE GREASE CAP Water Detected: Yes No Quantity: Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: | ☐ Yes ☐ No ⊠ Not Applicable | ⊠ N/A |
| (9, | 7.1) AROUND TENDON ANCHORAGE COMPONENTS Water Detected: Yes XNo. Quantity: O Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: Now | Yes No X Not Applicable | |
| 9.9 | 9.1) DURING DETENSIONING N/A Water Detected: Yes No Quantity: Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: | Yes No Not Applicable | <u> </u> |
| 77 | I. 1) NOTIFICATION NA Exelon Notified: Yes No Individual Name: | Date: | |
| SA | MPLE IDENTIFICATION AND STORAGE N/A (12.2) Samples adequately identified: Yes No (12.3) Samples stored at: | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |

| RSS | | | PSC PROCEDURE SQ 6.1 INSPECT FOR WATER Data Sheet 6.1 July 31, 2009 Page 1 of 1 Revision 0 |
|---|--|-----------------------------------|---|
| Project: TMI 35 ^{rH} YEAR | TENDON SURVEILLANCE | | |
| (8.1) Tendon No.: | <u> </u> | nd: <u>Botton</u> Os | hop AField |
| (9.5.1) DURING REMOVAL | OF GREASE CAP | | |
| Water Detected: | Yes No Quantity: | Sample Taken: | |
| Moisture Description: | Observable Moisture | Significant Molsture | Not Applicable |
| Comments: | None | | |
| (9.6.1) INSIDE GREASE C | ΔP | ••••• | , |
| Water Detected: | | Sample Taken: | |
| | Observable Moisture | Significant Moisture | |
| Comments: | . 1 | - | |
| Moisture Description: Comments: (9.9.1) DURING DETENSIO | DNING A | 1/2 | |
| | Yes No Quantity: Observable Moisture | Significant Moisture | Yes No N/A |
| (11.1) NOTIFICATION Exelon Notifie | d: 🗌 Yes 🗌 No Individual N | lame: MA | Date: |
| SAMPLE IDENTIFICATION (12.2) Samples adeq (12:3) Sa | | MA | |
| QC Signoff: | of coto | Level: II | Date: <u>10-26-10</u> |
| OC Reviewed: W | Vance toble | Level: T | Date: 10.29-10 |

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| ASME IV | NL (Class | CC) Contair | IIIIGHL I | endon Ancł | | | |
|--|--|---|--|--|---|--|--|
| | | VT-1 Visua | | | | | 1 |
| | | Page 1 | | | | | , |
| Station: TMI Ur | nit: Į | | -25-2 | 010 | Report No: | ************************************** | T |
| WO No(s): R2139507 | | Tendon Ancho | | | Tendon End | Shop | Field |
| Location: (Tunne), Gallery, Bu | uttress | | Eleva | | Bearing Plat | e I.D. Unable to | lac |
| Bearing Plate I.D. | Ancho | Head I.D. 81 | 2 | 8 | lushing I.D. 51 | 81 | |
| Exam Type: DV XVT-1 | | B.: | | | am: Direct | Remote | |
| As Found Exam | As Le | ft Exam Follow | ving Reten | | and the second se | ve Been Detent | ione |
| Design Drawing(s) TMI 1-001 | | يستدعوه والمكالي والتكاري والمتكار والتكار والمتكار والمتكار والمتكار والمتكار والمتكار والمتكار والم | Aids: No N | | | | |
| M&TE Used state R.21 6-24 | due A Test | | or Serial N | | Cal. D | ue Date: N/A | T |
| Illumination Used Flash list | | | nation Veri | | 10-25-2010 | | 0 |
| Special / Specific Instructions: | | | | | | | |
| Component / Item Number a | ind | RESULTS | | | Explanation / N | otes | |
| Description | NI | RITYPE | 10 (5 | | | icting Location C | Df A |
| | | | | | Protruding, Uns | | , |
| V-117 tendor Ancho components. | | | NA | o indicati | 2002 | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Results Legend: NI - | - No Indication | and the second secon | | tion IO – Inforn | nation Only | | |
| NI - | - No Indication | Recordable Ind | lication Type | | nation Only | | |
| NI - A. Missing Wires | - No Indication | Recordable Ind H. | lication Type Cracks | | nation Only | O. Other (E) | |
| A. Missing Wires B. Missing Button Heads | | Recordable Ind H. I. | lication Type Cracks Pitting | e Codes: | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | O. Other (Ex | (plai |
| NI - A. Missing Wires | | Recordable Ind H. I. J. | lication Type Cracks Pitting | e Codes: ges, Mechanical | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | O. Other (E) | cpla |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion | | Recordable Ind H. I. J. K. L. | lication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive | e Codes: ges, Mechanical im Stack Shim Gaps | l Damage | O. Other (E) | plai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion | es | Recordable Ind H. I. J. K. L. M. | lication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sea | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da | l Damage Image | O. Other (E) | (plai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (C | es Quantify) | Recordable Ind H. J. K. L. M. N. | lication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sea Surface Dit | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da scontinuities, De | l Damage Image flections | O. Other (E) | kplai |
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| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (C Supplemental Information : Y EXAMINER/EVALUATOR | es Quantify) YesNo | Recordable Ind H. J. K. L. M. N. | ication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sea Surface Dis Photo | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da scontinuities, De Video Ot Yes No | l Damage Image flections ther (Describe): | | |
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| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (C Supplemental Information : Y EXAMINER/EVALUATOR (Print & Sign) N. Cure. E. boous STATION/ADMIN REVIEW (Print & Sign) This section to be con RI or Unacceptable results A | es Quantify) Yes ⊡No Re: W. <i>Pance</i> Ev on Jo empleted on | Recordable Ind H. J. K. L. M. N. Sketch S suits: Acceptabl | lication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sea Surface Dis Photo | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da scontinuities, De Video Ot Yes No LEVEL | I Damage Image Iflections her (Describe): | DATE 10-25- 10/29/2010 | - 21 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (C Supplemental Information : Y EXAMINER/EVALUATOR (Print & Sign) V. Curr. E. Dodu'S STATION/ADMIN REVIEW (Print & Sign) This section to be con | es Quantify) Yes ⊡No Re: W. <i>Pance</i> Ev on Jo empleted on | Recordable Ind H. J. K. L. M. N. Sketch S suits: Acceptabl | Ication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sec Surface Dis Photo | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da scontinuities, De Video Ot Yes No LEVEL | I Damage Image Iflections her (Describe): | DATE 10-25- 10/29/2010 | - 21 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (C Supplemental Information : Y EXAMINER/EVALUATOR (Print & Sign) N. Cure. E. boous STATION/ADMIN REVIEW (Print & Sign) This section to be con RI or Unacceptable results A | es Quantify) Yes No Re: W. Pance Ev on To mpleted on Acceptable | Recordable Ind H. I. J. K. L. M. N. Sketch S suits: Acceptabl | Ication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sea Surface Dia Photo Photo Ie Photo Ie Photo Ie No | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da scontinuities, De Video Ot Yes No LEVEL | I Damage Image Iflections her (Describe): | DATE 10-25- 10/29/2010 | - 21 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wire D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (C Supplemental Information : Y EXAMINER/EVALUATOR (Print & Sign) N. Curre, E. Dodus STATION/ADMIN REVIEW (Print & Sign) This section to be con RI or Unacceptable results A Additional Actions: | es Quantify) Yes No Re: W. Pance Ev on To mpleted on Acceptable eport, etc. initiate | Recordable Ind H. I. J. K. L. M. N. Sketch S suits: Acceptabl | Ication Type Cracks Pitting Nicks, Gou Uneven Sh Excessive Gasket Sea Surface Dia Photo Photo Ie Photo Ie Photo Ie No | e Codes: ges, Mechanical im Stack Shim Gaps ating Surface Da scontinuities, De Video Ot Yes No LEVEL | I Damage Image Iflections her (Describe): | DATE 10-25- 10/29/2010 | - 21 |

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ATTACHMENT 5

ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| | Page 1 of 1 | | |
|---|------------------------------------|--|---|
| Station: TMF Unit: | 1 Date: 10-26 | -10 Repo | rt No: MA |
| WO NO(S): R 2139507 | Tendon Anchorage N | | Ion End: Shop Strield |
| Location: Tunnel, Gallery Buttress: | E | levation To Son Bear | ing Plate I.D.: Unable to |
| Bearing Plate I.D. | Anchor Head I.D. 139 | Bushing | 1.D. 1/A |
| Exam Type: DV XVT-1 | | Type Of Exam: 🖂 | |
| As Found Exam | As Left Exam Following Re | | hich Have Been Detentioned |
| Design Drawing(s) Tmr - 2-0.016 | Visual Aids: | | |
| | Test Card UTC or Seria | | Cal. Due Date: MA |
| Illumination Used Flash halt | Illumination | /erified: Date: 10-26- | 10 Time: 12125 P.M. |
| Special / Specific Instructions: | A- | | <u>.</u> |
| Component / Item Number and | RESULTS | Explana | ation / Notes |
| Description | NI RI TYPE IO | | ned Depicting Location Of All ling, Unseated Wires) |
| Anchurage Components For U-117 Bottom/Field. | | No Indication | S |
| | | | |
| Results Legend: - | | | |
| NI - No Ind | | dication IO – Information O | nly |
| A. Missing Wires | Recordable Indication H. Cracks | | O. Other (Explain) |
| B. Missing Button Heads | 1. Pitting | | |
| C. Protruding / Unseated Wires | | Gouges, Mechanical Damag | e |
| D. Broken Wires | | n Shim Stack | |
| E. Active Corrosion | | live Shim Gaps | |
| F. Other Corrosion G. Evidence Of Free Water (Quantify | | : Seating Surface Damage e Discontinuities, Deflections | |
| | No Sketch SPhoto | | |
| | | | |
| EXAMINER/EVALUATOR | red C. Elita | | L DATE 10-26-10 |
| (Print & Sign) Trothy C. Gibton | | LEVEL I | L DATE TO COTO |
| (Print & Sign) | m John m | | DATE 10/09/2010 |
| This section to be complet | ed only if Examiner/Eva | luator notes RI or Una | acceptable condition. |
| RI or Unacceptable results Accept | able 🗌 Yes 🗌 No | | |
| Additional Actions: | | | |
| (Action Request, Work Order, Issue Report, etc. | . initiated for Corrective Action) | | |
| LEVEL III or RI REVIEW (as applicab | | | DATE: |
| ANII REVIEW (as applicable) | seed fiftuiter | | DATE: 11-4-10 |
| | Page of | nn a san an a | an Annaichtean an Annaichtean an an an Annaichtean an Annaichtean an Annaichtean Ann |

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| ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 |
|--|
| Station: TMI Unit: Date: 10-25-2010 Report No: |
| System: Containment Component: Z'Area of convicte around V-119 7 war 10-25-10 No(s) .: R 213 9507 |
| Location: Building: Containment Elev .: N/2 Col.: N/2 Row: N/2 Azimuth/Radius: N/2 |
| Exam Type: DV GV XVT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Covered e |
| Design Drawing(s) TMT 1.00/6 Visual Aids: None |
| Surface: ID (D) Surface / Components Coated: YES X NO |
| M&TE Used: Mane Z Test Card UTC or Serial No. N/A Cal. Due Date: N/A |
| Illumination Used Flashlight Illumination Verified: Date: 10-25-2010 Time: 0730 Special / Specific Instructions: |
| Component / Item Number and RESULTS Explanation / Notes |
| Description NI RI TYPE IO (As a minimum, Record Location and Size of |
| (e.g. EIN, EID, etc.) Recordable Indications as applicable) |
| 2'Area of concrete around V-117. Shop/Top end No visable indications. |
| Results Legend: |
| NI - No Indications RI - Recordable Indication IO – Information Only |
| Recordable Indication Type Codes: A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metallic Items (Other) I. Popouts , Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : Yes No Sketch Photo Video Other (Describe): Results: Acceptable Yes No |
| EXAMINER/EVALUATOR (Print & Signal Barre Babbing W: Comes Collem LEVEL -77 DATE 10-25-2010 |
| |
| |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) |
| LEVEL III or RE REVIEW (as applicable) DATE: |
| ANII REVIEW (as applicable) Losoph & Skably DATE: 11-4-10 |
| Page of |

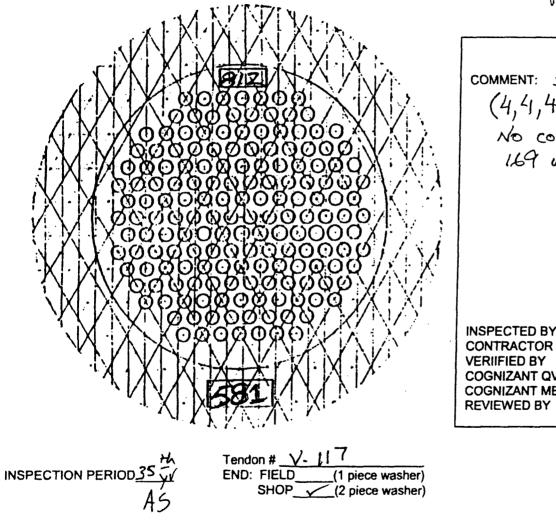
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| | | nent C | oncrete \ Report Page 1 of | | 6 C or VT-3C Visua | I Examina | tion NDE |
|---|--|---------------------------|---|------------------|---|--|------------------|
| Station: TMI | Unit: 1 | | | -26 | ~ <i>ID</i> R | eport No: - | 1/4 |
| System Fendowy C | omoonent | | <u> </u> | | Q12 1 1/2 M | IO No(s) a | 2119-20 |
| Cystern Jendony C | sinperien 29 ar | ea or | dos - | arov | no bearing pluse. | | |
| Location: Building | ContainmentEle | V. Ga | 1/8-1 C | | MA Row: M | | ith/Radius: MA |
| Exam Type: DV | GV XVT-1C | VT-3C | | | | iote Mat | . Type: Concrete |
| Design Drawing(s) 7 | | | Visual Ai | | | | |
| Surface: ID M&TE Used Skel Ruke | (OD cat he NITO | Cord | | | No. MA | | TNO |
| | | Card | UTC or S | | | | Due Date: 1/4 |
| Illumination Used Free Special / Special / Special / Specific Inst | | 1 | mum | main | on Verified: Date: | 10-16-10 | Time:/2:27 |
| Component / Iter | | <u> </u> | RESULTS | | Fv | planation / No | otes |
| Descri | | NI | RITYPE | 10 | (As a minimum, Red | | |
| | | | | | Recordable Indication | | |
| Concrete area : bearing plate. | 14" around | | | | No Indica | | |
| | | | | | | | |
| | NI - No Indicat | ions | Results RI - Recorda | | nd: dication 10 – Informatio | on Only | 1 |
| A. Cracks (Characteri B. Exposed Reinforci | ng Steel H. | Settle Degra | ordable Indica ements Or De aded Patches uts , Voids, H s | flectic or Re | ons M. Sca epairs N. Coa comb O. Abr. | ling / Dusting iting Deteriorat asion, Cavitatic Voids / Bug Ho | on, Wear |
| C. Exposed Metallic I D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Chem Supplemental Informa | se Leakage J. ure K. nical Attack L. ition : AYes No | Cold Corro | Joint Lines osion Staining Sketch | hoto | Q. Effic R. Oth | orescence er (Explain) (Describe): | |
| D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Cherr Supplemental Informa EXAMINER/EVALU (Print & Sign) Tund K C | se Leakage J. ure K. nical Attack L. ition : Hes No ATOR | Cold Corro | Joint Lines osion Staining Sketch | hoto | Q. Effic R. Oth Video Other | orescence er (Explain) (Describe): | DATE 10-2610 |
| D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Cherr Supplemental Informa EXAMINER/EVALU | se Leakage J. ure K. nical Attack L. ition : Hes No ATOR | Cold Corro | Joint Lines osion Staining Sketch | hoto | Q. Effic R. Oth Video Other | orescence er (Explain) (Describe): | |
| D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Cherr Supplemental Informa EXAMINER/EVALU (Print & Sign) Tund K C (C STATION/ADMIN R (Print & Sign) | ATOR | Cold Corro Results: | Joint Lines osion Staining Sketch All Acceptable | | Q. Effic R. Oth Video Other | Derescence er (Explain) (Describe): | DATE 10-26 C |
| D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Cherr Supplemental Informa EXAMINER/EVALU (Print & Sign) Tund K C C STATION/ADMIN R (Print & Sign) This section RI or Unacceptable Additional Actions: | se Leakage J. ure K. nical Attack L. nical Attack L. nical Attack L. No ATOR ATOR Sibron EVIEW Evice to be completed results Acceptabl | | Joint Lines osion Staining Sketch A Acceptable Sso Examiner Yes I | /Eva | Q. Effic R. Oth Video Other | Derescence er (Explain) (Describe): | DATE 10-26 C |
| D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Cherr Supplemental Informa EXAMINER/EVALU (Print & Sign) This section RI or Unacceptable Additional Actions: (Action Request, Work Ord | se Leakage J. ure K. hical Attack L. hition : Yes No ATOR EVIEW EVIEW to be completed results Acceptabl er. Issue Report, etc. init | | Joint Lines osion Staining Sketch A Acceptable Sso Examiner Yes I | /Eva | Q. Effic R. Oth Video Other | Describe): DATE M Unacceptal | DATE 10-26 C |
| D. Evidence Of Greas E. Evidence Of Moist F. Leaching Or Cherr Supplemental Informa EXAMINER/EVALU (Print & Sign) Tund K C C STATION/ADMIN R (Print & Sign) This section RI or Unacceptable Additional Actions: | se Leakage J. ure K. hical Attack L. htton: Hest No ATOR Kore Leakage J. No ATOR Kore Leakage J. No ATOR Kore Leakage J. No ATOR K. No No ATOR K. No No ATOR K. ATOR K. ATOR ATOR K. ATOR ATO | | Joint Lines osion Staining Sketch A Acceptable Sso Examiner Yes I | /Eva | Q. Effic R. Oth Video Other | DATE Constants | DATE 10-26 C |

ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection AS Found Inspection

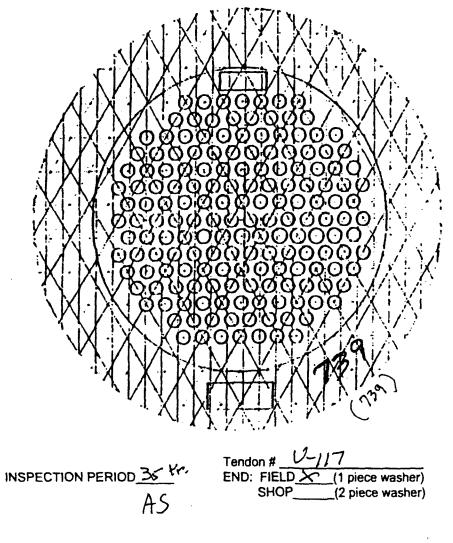


COMMENT: Shim stack ht. - 15.6" (4,4,4,1/2,1,2)No corrosion 169 wires seated. **INSPECTED BY** CONTRACTOR FOREMAN Date Date 10-25-10 COGNIZANT QV INSPECTOR WCOGNIZANT MECH/STRUCT ENGINEER DateZ9

RB Tendon Surveillance

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ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection AS Found Inspection



RB Tendon Surveillance COMMENT: Shim stack 4.1" (4") No convosion

| INSPECTED BY CONTRACTOR FOREMAN | Date |
|-------------------------------------|---------------------|
| COGNIZANT QV INSPECTOR | Date/0-26-10 |
| COGNIZANT MECH/STRUCT ENGINEER Hain | Date <u>290cr</u> 0 |

| RS5 | > | | | | July P | |
|-------------|-------------------------------|---------------------------------------|---------------------------------------|---|--|-------------|
| Project: TI | MI 35 TH YEAR TEND | ON SURVEILLANCE | | u <u>uuudooni</u> Maaliy ^j aagoonalise Autorikaikeen | <u>an in 1999 anns an Allana ann an Allandaran</u> | |
| Tendon No.: | <u>V-117</u> | Tendon End: | Τορ | 🔀 Shop | Field | |
| | | ANCHORAGE IN | SPECTION CRITE | RIA | | |
| | BEARING PLATE | SURFACE PROPERLY | PREPARED: | X YES | | |
| | | RFACE PROPERLY PR | | X YES | | |
| | GASKET MATING | SURFACE PROPERLY | PREPARED: | VES | | |
| | STUD/BOLT HOL | S PROPERLY PREPAI | RED: | X YES | | |
| | FOREIGN MATER | IAL EXCLUSION CONT | ROLLED: | VES | | |
| | COMMENTS | · · · · · · · · · · · · · · · · · · · | · · · · · · · · · · · · · · · · · · · | | | |
| | | | | | | |
| | | | | | | |
| CREW FORE | MAN SIGNOFF | Geta G U | et f | | Date: <u>+0-2</u> | <u>5-10</u> |
| QC Reviewe | a Tomy | Cidd | Level: | Ť. | Date: 10-2, | 891 |

25 SQ 12.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 86 of 523

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| Project: TMI 35 TM YEAR TENDON SURVEILLANCE Tendon No: V-117 Tendon End: Both own Shop ØKField ANCHORAGE INSPECTION CRITERIA BEARING PLATE SURFACE PROPERLY PREPARED: ØYES NO GREASE CAP SURFACE PROPERLY PREPARED: ØYES NO GREASE CAP SURFACE PROPERLY PREPARED: ØYES NO GASKET MATING SURFACE PROPERLY PREPARED: ØYES NO STUD/BOLT HOLES PROPERLY PREPARED: ØYES NO FOREIGN MATERIAL EXCLUSION CONTROLLED: OK COMMENTS Jonc ØYES NO COMMENTS Jonc ØYES NO COMMENTS Jonc ØYES NO COMMENTS Jonc ØYES Date: 10-26-12 | RSG | > | | | | PSC PROCEDURE S REPLACE GREAS Data She July 31 Page Rev | E CAP at 12.0 |
|---|-------------|--------------------------------|-----------------|---------------|--------------|--|------------------|
| ANCHORAGE INSPECTION CRITERIA BEARING PLATE SURFACE PROPERLY PREPARED: ATYES NO GREASE CAP SURFACE PROPERLY PREPARED: ATYES NO GASKET MATING SURFACE PROPERLY PREPARED: ATYES NO STUD/BOLT HOLES PROPERLY PREPARED: ATYES NO FOREIGN MATERIAL EXCLUSION CONTROLLED: ATYES NO FOREIGN MATERIAL EXCLUSION CONTROLLED: ATYES NO | Project: T | MI 35 TH YEAR TENDO | N SURVEILLANCE | | | | |
| BEARING PLATE SURFACE PROPERLY PREPARED: ETYES NO GREASE CAP SURFACE PROPERLY PREPARED: ETYES NO GASKET MATING SURFACE PROPERLY PREPARED: ETYES NO STUDBOLT HOLES PROPERLY PREPARED: ETYES NO FOREIGN MATERIAL EXCLUSION CONTROLLED: ETYES NO COMMENTS /bpe | Tendon No.: | V-117 | Tendon End: | Bottom | Shop | Field | |
| GREASE CAP SURFACE PROPERLY PREPARED: Image: Display the second seco | | | ANCHORAGE IN | SPECTION CRIT | ERIA | | |
| GASKET MATING SURFACE PROPERLY PREPARED: Diversion of the second | | BEARING PLATE S | URFACE PROPERLY | PREPARED: | X YES | | |
| STUD/BOLT HOLES PROPERLY PREPARED: | | GREASE CAP SUR | | REPARED: | YES | | |
| FOREIGN MATERIAL EXCLUSION CONTROLLED: | | GASKET MATING S | | PREPARED: | NYES | | |
| COMMENTS Jone | | STUD/BOLT HOLES | PROPERLY PREPA | RED: | A YES | | |
| CREW FOREMAN SIGNOFF (10-26-12) | | FOREIGN MATERIA | LEXCLUSION CONT | ROLLED: | TES | NO | |
| All of mail | | | 10- | | | | |
| All to made | | | | | | | |
| All to made | | | | | | | |
| All of mail | | | | | | <u>-</u> | |
| QC Reviewed: Amy C. Stone Level: IT Date: 10-28-10 | CREWFORE | | At lase | HQ | | Date: <u>10-26-</u> | -10 |
| | QC Reviewe | ad Jump C. | 1t | Level: | <u> </u> | Date: 10-281 | <u>v</u> |

PSC.PROCEDURE SQ 12.1 GREASE REPLACEMENT Data Sheet 12.1b – Hand Pumping July 31, 2009 Page 1 of 1 Revision 0

| Project: TMI 35 th YEAR TENDON SURVEILLANCE | Tendon No.: V | -117 |
|---|--|----------------------------|
| GREASE REPLACEMENT | | QC SIGNOFFS |
| 8.4) Grease Used 🛛 NEW 🗍 OLD - TEST DATE: 🗍 ACCEPTABLE [.0 PREREQUISITES | APPROVAL LETTER DATED: | WRR 10-26-10 |
| B.5) Total Grease Loss from Data Sheet 6.0 for <u>Shop Kap</u> tendon end: | <u> </u> | WREDIGIO |
| 8.6) Total Grease Loss from Data Sheet 6.0 for Field Gallery tendon end: | gal. | WRR. D-26-10 |
| 3.7) Estimated grease losses from leaks for <u>Shop Top</u> tendon end: | O gal. | WRRIDIER |
| 3.8) Estimated grease losses from leaks for Field (GALLON tendon end: | Ó gal. | WREIOZEIL |
| 3.9) TOTAL Tendon Grease Loss: | 4 gal. | WEEPJER |
| 3.0 POURING AND HAND PUMPING – FIRST END | · · · · · · · · · · · · · · · · · · · | |
| (3.6) Ambient Temp.: 6/ °F Thermometer ID: PK-102 Recal Date: (3.7) Grease Temp.: 220 °F Thermometer ID: PK-102 Recal Date: (13.9) Initial Grease Height (a) 18 in: (13.12) Final Grease Height (b) (3.14) Total amount of Grease added: 6.195 gal. (a-b) x 1.77 Into the | Shop/Top and | |
| | Hand Pumped | |
| 3.17) Total Grease <u>Replaced</u> this end: <u>6,199 gal</u> | e energia a contra a | WRK 10-26-10 |
| 3.0 HAND PUMPING - SECOND END I3.6) Amblent Temp.: •F Thermometer ID: Recal Date: | i | |
| 3.7) Grease Temp.: °F Thermoneter ID: Recal Date: | | |
| (13.9) Initial Grease Height (a) (13.9) Final Grease Height (b) | in. | |
| (13.5) mittal Grease added: gal. (a - b) × 1.77 into the | end | |
| | Hand Pumped | |
| | T Hang Fumper | DOM AL IN |
| 3-17) Total Grease <u>Replaced</u> this end: gal. 4.0 CALCULATION OF PRESSURE PUMPING | • | NR. 10-26-10 |
| 4.1) Total <u>Tendon</u> Grease Replaced: 6,195 gal. (13.17 + 13.17) | | 9 9 9 9 |
| 4.2) Nel Tendon Duct Grease Volume: 129.86 gal. Refer to SQ 12.2 - GREASE VOLUVES | for the Tendon Net Duct Volume | ič Ko Iz |
| 4 3) Percent Difference: Total Tendon Replaced (14.1) - Total Tendon Loss (8.9) | 169 % Difference | |
| Ket leidon Duct Grease volume (19,2) | | WKK 101610 |
| 4.4) Grease Leaks: Yes X No 4.5) Refill Acceptable: Yes (less than 10%) No (greater then 10%) | , | WR210-26-10 WR210-26-10 |
| If No - Customer Notified NCR No.: N/2 | 4 | WER 1076-10 |
| 4.6) Comments: Now | · | |
| 2 1 1 1 | | |
| Reviewed: Muto Level: 1 | Dale: 10-27 | -10 |

| GREAS | OCEDURE SQ 6.0 BE CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|---|--|
| Project: TMI 35TH YEAR TENDON SURVEILLANCE | |
| 7.2) Tendon No.: <u>V-118</u> Tendon End: <u>Top</u> XShop | Field |
| Grease Cap Removal | |
| 7.5)Date Removal Started: 10-19-10 | Q.C. Signoff |
| 7.8) Dry Ice Used on Grease Cap and/or Anchorage | α |
| 7.7) Temp. of Concrete: 78 °F Thermometer No.: 57-98 Re-Cal Date: 6-23-1/ | |
| Amblent Temp.: 68 F Thermometer No.: PK-103 Re-Cal Date: 6-23-11 | 1.63.10-19-10 |
| B.4) Anchorhead LD. : 793/578 Bushing Anchorhead Verification: Anchorhead Verification: | 7.1.9.10-19-10 |
| S.4) Anchomoda (D 13/ > 18 DUSNING | 1.00)·N-M-10 |
| 3.5) Grease Coaling | |
| Grease Cap - Complete V Parilal Uncoated % | |
| Buttonheads - Complete / Partial Uncoated % | |
| Anchorhead - Complete / Partial Uncoated % | |
| Shims - Complete / Paitlal Uncoated % | |
| Bearing Plate – ⁽¹⁾ Complete V Partial Uncoated % | 110.10-19-10 |
| ogginið inger og forskalde ver | |
| ⁽¹⁾ - Linited within the Inside diameter of the grease cap. | ····· |
| (1) - Limited within the Inside diameter of the grease cap. 6) Unusual Conditions: | 202-10-19-10 |
| 8) Unusual Conditions: Nove | · · · · · · · · · · · · · · · · · · · |
| 6) Unusual Conditions: Mone | 203:10-19-10 |
| 8) Unusual Conditions: <u>Mone</u> 8.7) Grease Color Match: ETYes INO Grease Color: <u>Brown</u> Comments: <u>Mone</u> | · · · · · · · · · · · · · · · · · · · |
| B:7) Grease Color Match: Mone B:7) Grease Color Match: Bives Comments: No Grease Color: Bives B:8) Quantity of Samples Quart Samples identified per Step 8.8.1? Bives | 203:10-19-10 |
| 8) Unusual Conditions: <u>Mone</u> 8.7) Grease Color Match: ETYes INO Grease Color: <u>Brown</u> Comments: <u>Mone</u> | 203:10-19-10 |
| B: 7) Grease Color Match: Mone B: 7) Grease Color Match: Image: Stresse Color: Comments: Mone B: 8) Quantity of Samples Quant S: 8) Quantity of Samples Quant Signature Quant Signature Quant Signature Quant Signature Quant Signature Quant Samples Quant Quant Samples Quant Quant Quant Samples Quant Samples< | 203:10-19-10 |
| B) Unusual Conditions: Mone 3.7) Grease Color Match: Sives Comments: No Grease Color Match: Sives Comments: No Grease Color Match: Sives Sis) Quantity of Samples Quart Sis Quart Samples identified per Step 8.8.1? No Location of Sis Removal Cap B.9) Qty. of Grease lost during removal of cap: Q gal. Q | 202].10-19-10 <u>7.1.5.10-19-10</u> XJ.10-19-10 <u>7.1.6.10-19-10</u> |
| AB) Unusual Conditions: Mone 3.7) Grease Color Match: Image: Stepsize Color: 3.7) Grease Color Match: Image: Stepsize Color: Comments: Mone 3.8) Quantity of Samples Image: Quart Samples identified per Step 8.8.1? J.8) Quantity of Samples Image: Quart Samples identified per Step 8.8.1? J.8) Quantity of Samples Image: Quart Samples identified per Step 8.8.1? J.8) Quantity of Samples Image: Quart Samples identified per Step 8.8.1? J.9) Qty. of Grease lost during removal of cap: Image: Qity of Grease removed from cap: 3.9) Qty. of Grease from cap to be reused? Image: Yes Image: Qity of Grease removed from cap: | 202:10-19-10 11.5.10-19-10 11.0.10-19-10 11.0.10-19-10 11.0.10-19-10 11.0.10-19-10 |
| B) Unusual Conditions: Mone 8) Unusual Conditions: Mone 8.7) Grease Color Match: Yes Comments: Mone Comments: Mone S.8) Quantity of Samples Quart S.8) Quantity of Samples Quart Location of Removal Mone S.9) Qty. of Grease lost during removal of cap: Quart S.9.1) Grease from cap to be reused? Yes 9.6) Qty. of Grease removed from anchorage: Q.5 9.6) Qty. of Grease removed from anchorage: Q.5 | 2 WJ. 10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> |
| (a) Unusual Conditions: Mone (b) Unusual Conditions: Mone (c) | 2003-10-19-10 14.3.10-19-10 103.10-19-10 103.10-19-10 103.10-19-10 103.10-19-10 |
| B) Unusual Conditions: Mone (6) Unusual Conditions: Mone (7) Grease Color Match: Image: Stepson Color: (7) Grease Color Match: Image: Mone (8) Quantity of Samples: (1) One (9) Quantity of Samples: (1) One (1) Color of Removal (1) One (1) Of Grease lost during removal of cap: (1) One (1) Of Grease lost during removal of cap: (1) One (2) Oly. of Grease removed from cap to be reused? (1) Yes (2) Oly. of Grease removed from anchorage: (2) S (2) Oly. of Grease removed from anchorage: (2) S (2) Oly. of Grease removed for anchorage cleaning? (1) Yes (2) On Match: (1) Yes (3) On Match: (1) Yes (2) On Match: (1) Yes (3) On Match: (2) Yes (3) On Match: (2) Yes < | 2 W. 10-19-10 <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> |
| B) Unusual Conditions: Mone (7) Grease Color Matchi: Styres No Grease Color: Stown Comments: Mone Comments: Mone Stown Stown (8) Quantity of Samples Quart Samples identified per Step 8.8.17 Stown No Location of Removal Stone Quart Samples identified per Step 8.8.17 Stose No 10.3) Method of Tendon Protection: Mone Stone Stone Store Store Store (6) Unusuel Conditions: Mone Store Store Store Store No (7) Comments: Mone Store S | 2 W. 10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> |
| B) Unusual Conditions: Mone (7) Grease Color Match: EYes No Grease Color: Brown (7) Grease Color Match: No Grease Color: Brown (7) Grease Color Match: No Grease Color: Brown (8) Quantity of Samples Quart Samples identified per Step 8.8.17 Brown (8) Quantity of Samples Quart Samples identified per Step 8.8.17 Bros No Location of Removal B.P. Ath. B.P. Ath. Duct (9) Qly. of Grease lost during removal of cap: O gal. Qal. (9) Qly. of Grease from cap to be reused? Yes Ø No Qly. of Grease removed from cap: Q.S. gal. (9) Qly. of Grease removed from anchorage: Q.S. gal. Q.S. gal. Doscribe: MA (9) Qly. of Grease removed from anchorage cleaning? Yes Ø No Doscribe: MA (10.3) Method of Tendon Protection: Beinstall Can with new Gasket 240 - 10-M-10 MA | 2 W. 10-19-10 <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> <u>115.10-19-10</u> |
| A) Unusual Conditions: Mone 3.7) Grease Color Match: Yes No Grease Color: Statum 3.7) Grease Color Match: Mone Grease Color: Statum Statum 3.8) Quantily of Samples 2 Quant Samples identified per Step 8.8.17 Stas No 1.0. Location of Removal 2 Quant Samples identified per Step 8.8.17 Stas No 1.0. Location of Removal 2 Quant Samples identified per Step 8.8.17 Step 5 No 1.0. Location of Removal 2 Quant Samples identified per Step 8.8.17 Step 5 No 1.0. Iteration of Removal 2 Quant Samples identified per Step 8.8.17 Step 5 No 3.9) Qly. of Grease lost during removal of cap: 2 Gal. Qal. Qal. <td>2 W. 10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u></td> | 2 W. 10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> |
| A) Unusual Conditions: Mone 3.7) Grease Color Match: Image: Stress I no Comments: No Comments: No S.8) Quantity of Samples Quart S.9) Qiv. of Grease lost during removal of cap: Ogal. 3.9) Qiv. of Grease lost during removal of cap: Quart S.9) Qiv. of Grease lost during removal of cap: Quart Quart Yes S.9) Qiv. of Grease removed from anchorage: Quart Quart Samples Quiv. of Grease removed from anchorage: Quart Quart Samples Quiv. of Grease removed from anchorage: Quart Quart Samples Quiv. of Grease removed from anchorage: Quart Quart Yes Quart Samples Quart Samples Quart Samples Quart Grease removed from cap: Quart Yes Quart Grease removed from cap: | 2 W. 10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> |
| (a) Unusuel Conditions: <u>Mone</u> (b) One (comments: <u>Mone</u> (commented form comments: <u>Mone</u> (comments: <u>Mone</u><td>263.10-19-10 <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u></td> | 263.10-19-10 <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> <u>163.10-19-10</u> |
| B) Unusual Conditions: Mone 8.7) Grease Color Match: Styss No Grease Color: Stown 6.8) Quantity of Samples: Mone Mone Stown Stown 6.8) Quantity of Samples: 2 Quant Samples identified per Step 8.8.1? Stown 6.8) Quantity of Samples: 2 Quant Samples identified per Step 8.8.1? Stown 6.9) Qty. of Grease lost during removal of cap: 0 gal. Duct 8.9) Qty. of Grease lost during removal of cap: 0 gal. 9.6) Qty. of Grease from cap to be reused? Yes Ston Qty. of Grease removed from cap: Q.5 gal. 9.7) Damage during cap removal or anchorage: 2.5 gal. Storn With wilk gasket; 244: 10-19-10 Thifall icon with wilk gasket; 244: 10-19-10 10.3) Method of Tendon Protection: Reinstall Can with new gasket; gal. 10.4) Amount of Grease Loss from Tendon duct: 0 gal. 10.5) Total guantity of lost grease (below): Stotal guantity of lost grease (below): | 2 W. 10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> |
| (a) Unusual Conditions: M_{DAC} 3.7) Grease Color Match: M_{DAC} 3.7) Grease Color Match: M_{DAC} 3.7) Grease Color Match: M_{DAC} 3.8) Quantity of Samples 2 Quart Samples identified per Step 8.8.17 M_{DAC} M_{DAC} 3.8) Quantity of Samples 2 Quart Samples identified per Step 8.8.17 M_{DAC} M_{DAC} 3.8) Quantity of Samples 2 Quart Samples identified per Step 8.8.17 M_{DAC} M_{DAC} 3.8) Quantity of Samples 2 M_{DAC} M_{DAC} 3.8) Quantity of Samples 2 M_{AC} M_{DAC} M_{AC} M_{A | 2003.10-19-10 <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> <u>113.10-19-10</u> |

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| | CEDURE SQ 6. CAP REMOVA Data Sheet 6. July 31, 200 Page1 of Revision |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (7:2) Tendon No.: V-118 Tendon End: Bottom Shop | - Field |
| Grease Cap Removal | |
| (7.5)Date Removal Started: 10 - 19 - 10 | Q.C. Signol |
| (7.6) Dry Ice Used on Grease Cap and/or Anchorage Yes Yes Yes (7.7) Temp. of Concrete: 8 4 °F Thermometer No.: 57.78 Re-Cal Date: 6-23-// Ambient Temp.: 82. °F Thermometer No.: 9//-03 Re-Cal Date: 6-23-// (8.4) Anchorhead I.D.: 59.7 Anchorhead Verification: Statch No-Match | 263 10-19-1 7. CS 10-19-1 |
| (8:5) Grease Coating Grease Cap - Complete Partial Uncoated % Buttonheads - Complete V Partial Uncoated % Anchorhead - Complete V Partial Uncoated % Shims - Complete V Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete V Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete V Partial Uncoated % (¹⁾ - Limited within the inside diameter of the grease cap. V V V V | <u> 1.03 joig n</u> |
| B) Unusual Conditions: None | US p-H-10 |
| (8.7) Grease Color Match: Deres INO Grease Color: All Brown Comments: None | 703 10-19-10 |
| (8.8) Quantity of Samples 2. Quart Samples Identified per Step 8.8.1? XTYPS | |
| Location of ASA.H. B.P. STShims Dep Duct | 269 10-19-10 |
| (8.9) Qty. of Grease lost during removal of cap: (8.9.1) Grease from cap to be reused? 27 Yes INO (9.8) Qty. of Grease removed from anchorage: (9.7) Damage during cap removal or anchorage cleaning? Yes 2 No (8.9.1) Grease removed from cap: (9.7) Damage during cap removal or anchorage cleaning? Yes 2 No (9.7) Damage during cap removal or anchorage cleaning? | 102 10-19-10 Jun 10-19-10 102 10-19-10 202 10-19-10 |
| Install can with old Gusket 242 10-A-10 | Out has and |
| (10.3) Method of Tendon Protection: <u>Trisfull can with New Casket</u> . (10.4) Amount of Grease Loss from Tendon duct: U.C. gal. | 201.10-27-10 |
| (10.4) Amount of Gréase Loss from Tendon duct: <u>U.S</u> gal. | 100 10-19-10 |
| (10.5) Total quantity of lost grease (below): (8.8) $\frac{5}{5}$ + (8.9) $\frac{6}{5}$ + (8.9.1) $\frac{5}{5}$ + (9.8) $\frac{5}{5}$ + (10.4) $\frac{4.5}{5}$ = $\frac{6}{5}$ TOTAL | 202 10-19-1 |
| (11.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. SY's INO | 1.63-10-19-10 |
| CReviewed: Date: Date: | |

15 SQ 6.0 TM;09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 90 of 523

| Project: TMI 35 TH YE | AR TENDON SURVEILLANCE | | | - Tringeland y an try a |
|--|---|---------------|--------------------------|------------------------------------|
| (8.1) Tendon No.: | V-118 Tendon | End: Top St | Shop 🔲 Fi | leid |
| 9.5.1) DURING REMO Water Detecto Moisture Descriptio Commen | n: Dbservable Moisture | Sample Taken: | Yes No | 151 N/A |
| 9.6.1) INSIDE GREAS Water Detecte Molsture Description Commen | id: Yes ANO Quantity: in: Observable Moisture ts: | Sample Taken: | Yes No Not Applicable | 251N/A |
| | Is: None | Sample Taken: | Yes No Not Applicable | XSTNIA |
| (9.9.1) DURING DETE Water Detect Moisture Descripti Commer | ISIONING ed: | Sample Taken: | Yes No Not Applicable | |
| | tified: 🔲 Yes 🗌 No Individua | Name: | Date: | |
| | | · MA | | ********** |

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¹⁶ EpicalTReportSQ06 Revion 0 Attachment 8.7 Page 91 of 523

| | RSG Solo | | | PSC PROCEDURE SQ 6.1 INSPECT FOR WATER Data Sheet 6.1 July 31, 2009 Page 1 of 1 Revision 0 |
|------------|---|--|-----------------|---|
| F | Project: TMI 35 TH YEAR | TENDON SURVEILLANCE | | |
| | (8.1) Tendon No.: | Tendo | n End: Bottom | Shop R Fleid |
| . (\$ | Comments: | Yes Xio Quantity: Observable Moisture None | Sample Taken: | |
| (9 | 9.6.1) INSIDE GREASE C Water Detected: Moisture Description: Comments: | AP | Sample Taken: | Yes No XN/A |
| (9 | 9.7.1) AROUND TENDON Water Detected: Moisture Description: Comments: | | | |
| <u>(</u> 9 | 9.9.1) DURING DETENSIO Water Detected: Moisture Description: Comments: | DNING | Sample Taken: | |
| (1 | 1.1) NOTIFICATION Exelon Notifie | d: 🗌 Yes 🗌 No Individu | al Name: /// | .Oate: |
| S | AMPLE IDENTIFICATION (12.2) Samples adeq (12.3) Sa | | io NA | |
| | QC Signoff: | M C. State == | Level: <u> </u> | Date: <u>10-19-10</u> Date: <u>10-28-1D</u> |

ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage **Detailed Visual or VT-1 Visual Examination NDE Report** Page 1 of 1 Station: TMT Unit: Date: Report No: 10-19-2010 WO No(s) .: Tendon Anchorage No.: Tendon End: X Shop R2139507 11-118 **Field** ynable to Location: (Tunnel) Gallery, Buttress: Elevation: 456-2" Bearing Plate I.D.: Bearing Plate I.D. Unable to locate Anchor Head I.D. Bushing I.D. 578 793 Exam Type: DV XVT-1 Type Of Exam: Direct Remote As Found Exam As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned Visual Aids: None Design Drawing(s) TMI 1-0016 UTC or Serial No. M&TE Used Heal Role Roll Col X Test Card Cal. Due Date: MA Illumination Used Goot Light Special / Specific Instructions Illumination Verified: Date: 10-19-10 Time: 12:30 MM Component / Item Number and RESULTS Explanation / Notes Description **RI TYPE** (Sketch Shall Be Attached Depicting Location Of All NI 10 Missing, Protruding, Unseated Wires) 2 protruding wires. Both protruding ,100". See enclosure 6 Data sheet 4. V-118 Tendon Anchurage $\boldsymbol{<}$ Shop/Top end. These wires appoar to be 0 slightly oversized. **Results Legend:** NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: Missing Wires Cracks A. Ĥ. 0. Other (Explain) Missing Button Heads Pitting 8. 1. Protruding / Unseated Wires C. J. Nicks, Gouges, Mechanical Damage Broken Wires Κ. D. Uneven Shim Stack Ε. Active Corrosion Ł. Excessive Shim Gaps F Other Corrosion M. Gasket Seating Surface Damage Surface Discontinuities, Deflections Evidence Of Free Water (Quantify) Supplemental Information : SYes No Sketch Photo Video Other (Describe): **Results:** Acceptable XYes No **EXAMINER/EVALUATOR** DATE 10-19-10 (Print & Sign) Timoth C. Gibson LEVEL STATION/ADMIN REVIEW 10/29/2010 DATE (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable X Yes No No 4 NOV 10 Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action DATE: 29 Octo LEVEL III or RI REVIEW (as applicable) Jawano ANII REVIEW (as applicable) DATE: 11-4-10 Page

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| Station: TMI Unit: 1 | Date: 10 | 19-10 | Report No: | NA | |
|---|--------------------------|--|--|----------------------------------|----------|
| WO No(s): R 2139501 | Tendon Anc | norage No.: U-118 | Tendon End | : Shop KF | |
| Location: Tunnel Gallery Buttress | | Elevation Tendon | Bearing Pla | te I.D.: Unable to | > |
| Bearing Plate I.D. Unable Jo locate | Anchor Head I.D. | | Bushing I.D. 1 | TA. | |
| Exam Type: DV XVT-1 | | Type Of E | xam: Direct | Remote | |
| As Found Exam | As Left Exam Follo | wing Retensioning Of Ter | ndons Which Ha | ave Been Detentio | oned |
| Design Drawing(s) TMI 1-0016 | Visu | al Aids: None | | | |
| M&TE Used Steel Rule R-22 6-63-11 2 | Test Card UTC | or Serial No. MA | Cal. [| Due Date: MA | Γ |
| Illumination Used Flashlight | Illum | ination Verified: Date: | 10-19-10 | Time: 8:00 A | 71 |
| Special / Specific Instructions: | A | | ······································ | | |
| Component / Item Number and | RESULTS | | Explanation / N | Votes | <u></u> |
| Description | NI RITYPE | | e Attached Dep Protruding, Un | picting Location O seated Wires) | f All |
| Tendon anchorage on V-118 Bottom/Field End | | No indicat No corrosi | | | |
| Results Legend: NI - No Ind | | rdable Indication IO – Inform Idication Type Codes: | nation Only | | 1 |
| A. Missing Wires | H. | Cracks | <u></u> | O. Other (Exp | plain) |
| B. Missing Button Heads | ł. | Pitting | 1.0 | | |
| C. Protruding / Unseated Wires D. Broken Wires | J. K. | Nicks, Gouges, Mechanica Uneven Shim Stack | l Damage | | |
| E. Active Corrosion | L. | Excessive Shim Gaps | | | |
| F. Other Corrosion | M. | Gasket Seating Surface Da | amage | | |
| G. Evidence Of Free Water (Quantify | | Surface Discontinuities, De | eflections | | |
| Supplemental Information : STes | No 🗌 Sketch | | ther (Describe): | | |
| | Results: Accepta | ole Ares No | | | <u> </u> |
| Print & Sign) Timety C. Gibson | M Cotto | LEVE | - II- | DATE 10-19- | D |
| STATION/ADMIN REVIEW | John | \sim | DATE | 10/29/2010 | |
| This section to be complete | ed only if Exami | ner/Evaluator notes RI | or Unaccepta | able condition. | |
| RI or Unacceptable results Accepta | • | No | 1 | | |
| Additional Actions: | | | | | |
| (Action Request, Work Order, Issue Report, etc. | initiated for Corrective | Action) | | | |
| LEVEL III or RI REVIEW (as applicable | | | DATE: | | |
| ANII REVIEW (as applicable) | esich Ather | 264 | DATE | 11-4-10 | L |
| 0- | Page <u>/</u> | _ of | | | |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report

| Detailed Vis | sual or VT-1 V Pa | isual Exa age 1 of 1 | mination ND | E Report | | | |
|---|--------------------------|-------------------------|--|------------------------------------|---|--------------------------|--|
| Station: TMI Unit: | I Date: | | - ZOID | Report No: | | | |
| WO No(s): R2139507 | Tendon / | Anchorage I | No.: V-118 | Tendon End | d: 🔀 Shop 🗌 F | ield | |
| Location: Junnel Gallery, Buttres | SSI | E | Elevation: | Bearing Pla | te I.D. Umble to 1 | beste | |
| Bearing Plate I.D. | Anchor Head I.C | 793 | | Bushing I.D. 5 | 78 | | |
| Exam Type: DV 🗹VT-1 | | | Type Of | Exam: 🔀 Direct | Remote | | |
| | 🗙 As Left Exam F | | | endons Which H | ave Been Detentio | oned | |
| Design Drawing(s) TMI 1-0016 | \ | Visual Aids: | | | | | |
| M&TE Used Steel scale R-ZI 2-24-11 | A Test Card L | UTC or Seri | | | Due Date: NA | | |
| Illumination Used Flashlist | | Illumination | Verified: Date | 10-26-201 | O Time: 130 | $\underline{\infty}_{-}$ | |
| Special / Specific Instructions: Component / Item Number and | RESUL | TO | | Evelopetion () | lataa | | |
| Description | NI RITYF | | (Sketch Shall | Explanation / N Be Attached Der | | ocation Of All Vires) | |
| Decemption | | | | g, Protruding, Un | | | |
| V-118 tendow Anchorage components At top/shop end. | R | A | 3 missing u | stres-1 rema | oved for tes | ting | |
| components At top/shot | ۵ | | 2 worked AS | protrudin | g in 13 for to be broke etensione | m | |
| PAH | / | | PXAM WPI | re found + | to he hroke | LN | |
| cruz. | | | when tend | PAL WAS d | deusione | д. | |
| | | | They have | been rem | niedz | | |
| | | | INCINAN | | | | |
| , | | | | | | | |
| Results Legend: | | | | | | | |
| | ndications RI - F | Recordable Ir | ndication 10 - Info | rmation Only | | 1 | |
| | Recordab | ole Indication | a the second | | | | |
| A. Missing Wires B. Missing Button Heads | | H. Cracks | | | O. Other (Ex | plain) | |
| C. Protruding / Unseated Wires | | | Gouges, Mechanie | cal Damage | | | |
| D. Broken Wires K. Uneven Shim Stack | | | | | | | |
| E. Active Corrosion F. Other Corrosion | | | | | | | |
| G. Evidence Of Free Water (Quanti | | | e Discontinuities, (| | | | |
| Supplemental Information : Yes | | | | Other (Describe) | | | |
| | Results: Acce | | Yes No | <u></u> | ······ | 1 | |
| EXAMINER/EVALUATOR | 10.4 | ρII | | | | | |
| (Print & Sign) W. RANCE Robbins | W. Conce 4 | de | LEVI | EL <u>74</u> | DATE 10-26 | -201 | |
| STATION/ADMIN REVIEW | T. | (\frown) | | | 10/29/2010 | | |
| (Print & Sign) | an Johnson | | | DATE | | <u></u> | |
| - | - | | | | able condition. | | |
| RI or Unacceptable results Accep | ptable 🗌 Yes | 🗌 No | No | $(\zeta - \mathcal{L})$ | | | |
| Additional Actions: (Action Request, Work Order, Issue Report, e | atc initiated for Correc | Tive Action | \square | | | | |
| LEVEL III or RI REVIEW (as applica | ~1/~ | | HOWARD | DATE: | 29 0010 | + | |
| ANII REVIEW (as applicable) | Hasek 1 x | H. Lla | | | 11-4-10 | | |
| | queren A X | ner y | | | | <u></u> | |
| U | Page | e of | _ | | | | |

ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| Charlins T 11 T Units A | | | 1 01 | |
|--|--|---|--|--|
| Station: TMI Unit: 1 |) | Date: 10 | -26- | 10 Report No: V/A |
| WO No(s) .: R 2139507 | T | Tendon Anch | | No.: U-118 Tendon End: Shop X Field |
| Location: Tunnel Gallery Buttress: | | | | Elevation: Galley Bearing Plate I.D.: Jocate |
| | | Head I.D. 3 | | Bushing I.D. N/A |
| Exam Type: DV DV T-1 | | 11000 1101 0 | | Type Of Exam: Direct Remote |
| | Aste | ft Exam Follo | wing F | Retensioning Of Tendons Which Have Been Detentioned |
| Design Drawing(s) TMI-00/6 | | | al Aids | |
| M&TE Used steel Rule A.22 8-28-11 | Test | | | rial No. MA Cal. Due Date: MA |
| Illumination Used Flashlight | | | transferrance in the second second | Verified: Date: 10-26-10 Time: 12:35 P/ |
| | YA | | | |
| Component / Item Number and | | RESULTS | | Explanation / Notes |
| Description | NI | RI TYPE | 10 | (Sketch Shall Be Attached Depicting Location Of All |
| | | | | Missing, Protruding, Unseated Wires) |
| And wall components | | φ. | D | 2-broken wires removed for testing. 10-24-10, 10-26-10 |
| Anchorage = omponents for v-118 Bottom/Kield | | 1026-10 | | 10-24-10, 10-26-10 |
| for U-118 Bottom/Field | | A | A | 1-wire pulled during surveillance for testing. 10-26-70 1- Protruding wire .060". |
| | | | | Free Local 10-26-112 |
| Post Retension. | | | | Tor resting. Is be in |
| | | 4 | C | 1- Protruding wire ,060". |
| | | | | 3 . |
| | | | | |
| Results Legend: | , | | | |
| NI - No Indi | ication | | | Indication IO – Information Only |
| | | H. | Crac | |
| A Missing Wires | | | | ks O Other (Explain |
| A. Missing Wires B. Missing Button Heads | | l. | Pittin | - · · · · · · · · · · · · · · · · · · · |
| B. Missing Button Heads C. Protruding / Unseated Wires | | l. J. | Pittin Nicks | g s, Gouges, Mechanical Damage |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires | | l. J. K. | Pittin Nicks Unev | g s, Gouges, Mechanical Damage ren Shim Stack |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion | | l. J. K. L. | Pittin Nicks Unev Exce | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify) | () | l. J. K. | Pittin Nicks Unev Exce Gask | g s, Gouges, Mechanical Damage ren Shim Stack |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify) | () No | l. J. K. L. M. N. | Pittin Nicks Unev Exce Gask Surfa | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps set Seating Surface Damage |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify) | No | l. J. K. L. M. N. | Pittin Nicks Unev Exce Gask Surfa | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps set Seating Surface Damage ace Discontinuities, Deflections |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Ares D | No | I. J. K. L. M. <u>N.</u> Sketch | Pittin Nicks Unev Exce Gask Surfa | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps set Seating Surface Damage ace Discontinuities, Deflections to Video Other (Describe): |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Pres EXAMINER/EVALUATOR (Print & Sign) Timety C. Guban | No | I. J. K. L. M. <u>N.</u> Sketch | Pittin Nicks Unev Exce Gask Surfa | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps ret Seating Surface Damage ace Discontinuities, Deflections rtoVideo Other (Describe): |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes EXAMINER/EVALUATOR (Print & Sign) Time of Colour STATION/ADMIN REVIEW | No Rei | I. J. K. L. M. N. Sketch sults: Acceptal | Pittin Nicks Unev Exce Gask Surfa | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps set Seating Surface Damage ace Discontinuities, Deflections itoVideoOther (Describe): VideoOther (Describe): LEVELDATE LEVELDATE |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Ares Internation EXAMINER/EVALUATOR (Print & Sign) Track Coloson STATION/ADMIN REVIEW (Print & Sign) | No Res M L | I. J. K. L. M. N. Sketch suits: Acceptal | Pittin Nicks Unev Exce Gask Surfa Pho ble | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps ret Seating Surface Damage ace Discontinuities, Deflections reto Video Other (Describe): Pres No LEVEL T_ DATE 10-26-10 DATE 10/29.6010 |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes EXAMINER/EVALUATOR (Print & Sign) (Print & Sign) (Print & Sign) (Print & Sign) This section to be completed | No Rei M C d d on | I. J. K. L. M. N. Sketch suits: Acceptal | Pittin Nicks Unev Exce Gask Surfa | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps set Seating Surface Damage ace Discontinuities, Deflections ito VideoOther (Describe): VideoOther (Describe): LEVEL DATE 10-26-10 LEVEL DATE 10-26-10 |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes EXAMINER/EVALUATOR (Print & Sign) This section to be complete RI or Unacceptable results Accepta | No Rei M C d d on | I. J. K. L. M. N. Sketch suits: Acceptal | Pittin Nicks Unev Exce Gask Surfa Pho ble | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps ret Seating Surface Damage rece Discontinuities, Deflections rece Disconties rece Disco |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes Supplemental : Yes Supplemental : Yes Su | No Re: M d d d d d d d d d d | I. J. K. L. M. N. AFSketch sults: Acceptal | Pittin Nicks Unev Exce Gask Surfa Pho ble | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps ret Seating Surface Damage rece Discontinuities, Deflections rece Disconties rece Disco |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes EXAMINER/EVALUATOR (Print & Sign) This section to be complete RI or Unacceptable results Accepta Additional Actions: (Action Request, Work Order, Issue Report, etc. | No Res M ed on able | I. J. K. L. M. N. AFSketch sults: Acceptal | Pittin Nicks Unev Exce Gask Surfa Pho ble | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps ret Seating Surface Damage ace Discontinuities, Deflections toOther (Describe): MyesNo LEVEL DATE 10/29,0010 DATE 10/29,0010 DATE 10/29,0010 raluator notes RI or Unacceptable condition. |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes EXAMINER/EVALUATOR (Print & Sign) Free Yater (Quantify STATION/ADMIN REVIEW (Print & Sign) This section to be complete RI or Unacceptable results Accepta Additional Actions: | No Res M ed on able | I. J. K. L. M. N. AFSketch sults: Acceptal | Pittin Nicks Unev Exce Gask Surfa Pho ble | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps set Seating Surface Damage ace Discontinuities, Deflections itoOther (Describe): MyesNo LEVELDATE 10-26-10 DATE 10/20/0010 valuator notes RI or Unacceptable condition. DATE: |
| B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantify Supplemental Information : Yes EXAMINER/EVALUATOR (Print & Sign) This section to be complete RI or Unacceptable results Accepta Additional Actions: (Action Request, Work Order, Issue Report, etc. | No Res M ed on able | I. J. K. L. M. N. AFSketch sults: Acceptal | Pittin Nicks Unev Exce Gask Surfa Pho ble | g s, Gouges, Mechanical Damage ren Shim Stack ssive Shim Gaps ret Seating Surface Damage ace Discontinuities, Deflections toOther (Describe): MyesNo LEVELDATE 10-26-10 DATE 10/28_0010 valuator notes RI or Unacceptable condition. |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report

| Pa | ge | 1 | of | 1 | |
|----|----|---|----|---|--|
| | | | | | |

| Station: TMI Unit: | Date: 10- | 27-2010 Report No: |
|--|--------------------------------|---|
| WO NO(S): R2139507 | Tendon Anchora | ge No.: 🗸 – 118 Tendon End: 🔀 Shop 🗋 Field |
| Location: (Tunnel) Gallery, Buttress | | Elevation: Bearing Plate I.D.: Unable to loca |
| Bearing Plate I.D. | Inchor Head I.D. 79 | Bushing I.D. 578 |
| Exam Type: DV XVT-1 | | Type Of Exam: XDirect Remote |
| 🗋 As Found Exam 🛛 🗙 | As Left Exam Followin | g Retensioning Of Tendons Which Have Been Detentioned |
| Design Drawing(s) TML 1-0016 | Visual A | ids: Nove |
| M&TE Used stale 8-71 Carster 1 | Test Card UTC or | Serial No. N/A Cal. Due Date: N/A |
| Illumination Used Flash light | Illuminal | ion Verified: Date: 10-27-2010 Time0745 |
| Special / Specific Instructions: | | |
| Component / Item Number and | RESULTS | Explanation / Notes |
| Description | NI RITYPE IC |) (Sketch Shall Be Attached Depicting Location Of All Missing, Protruding, Unseated Wires) |
| V-118 tendors Anchorage | A | 3 missing wires - I removed for test |
| components # shop/ top end. | | 2 Noted as protructing in as found exam were found to be broken |
| 1-0 and | | exam were found to be broken |
| top and | | when fendow was detensioned. |
| | | They have been removed. |
| | | For location see enclosure to data sheet (|
| Results Legend: | | |
| NI - No Ind | | ble Indication IO – Information Only |
| A. Missing Wires | Recordable Indica | acks O. Other (Explain |
| B. Missing Button Heads | | tting |
| C. Protruding / Unseated Wires | | cks, Gouges, Mechanical Damage |
| D. Broken Wires | | neven Shim Stack |
| E. Active Corrosion F. Other Corrosion | | ccessive Shim Gaps asket Seating Surface Damage |
| G. Evidence Of Free Water (Quantify | | Inface Discontinuíties, Deflections |
| Supplemental Information : Yes | | hoto Video Other (Describe): |
| | Results: Acceptable | Yes No |
| (Print & Sign) N. Rake Robbins W. | Pana Kobl- | LEVEL I DATE 10-27-20 |
| STATION/ADMIN REVIEW | <u> </u> | |
| (Print & Sign) Eva | Johnson W | DATE 10/201 2010 |
| - | - | Evaluator notes RI or Unacceptable condition. |
| RI or Unacceptable results Accepta | able 🗌 Yes 🔲 N | lo |
| Additional Actions: | | |
| (Action Request, Work Order, Issue Report, etc | initiated for Corrective Actic | n) |
| LEVEL III or RI REVIEW (as applicable | 9) | DATE: |
| ANII REVIEW (as applicable) | & AMally | DATE: //- 4-10 |
| \mathcal{O} | Page of | 1 |

| ATTACHMENT 5 | | | | | | |
|--|--|----------------|--|--|--|--|
| ASME IWL (Class CC) Containment Tendon Anchorage | | | | | | |
| Detailed Visual or VT-1 Visual Examination NDE Report | | | | | | |
| Page 1 of 1 | | | | | | |
| Station: TMI Unit: 1 | | | | | | |
| WO NO(S): R 2139 507 | Tendon Anchorage No.: V~1/8 Tendon End: Shop SFie | ld | | | | |
| Location: Tunnel, Gallery, Buttress | Elevation. Tend ON Bearing Plate I.D.: Unable to | | | | | |
| | Anchor Head I.D. 597 Bushing I.D. MA | | | | | |
| Exam Type: DV XVT-1 | Type Of Exam: Direct Remote | | | | | |
| | As Left Exam Following Retensioning Of Tendons Which Have Been Detention | led | | | | |
| Design Drawing(s) TMI 2-0016 | Visual Aids: None | | | | | |
| | Test Card UTC or Serial No. Cal. Due Date: "// | | | | | |
| Illumination Used Ehshlight | Illumination Verified: Date: 10-27-10 Time: 812 AA | n | | | | |
| Special / Specific Instructions: | NA | | | | | |
| Component / Item Number and | RESULTS Explanation / Notes | | | | | |
| Description | NI RITYPE IO (Sketch Shall Be Attached Depicting Location Of A | A 11 | | | | |
| | Missing, Protruding, Unseated Wires) | | | | | |
| To Pa Andread an | O 2-Broken Wires Pulled for Testing. | | | | | |
| rendon Anonorage on | | | | | | |
| V-118 Bottom/Field | (10-24-10) (10-26-10) | | | | | |
| Unio Domot Fice - | A 1-wire Pulled During Surveillance | | | | | |
| / | For Testing - 10-26-10 All 166 Wires Are Seated. | | | | | |
| | | | | | | |
| | All 166 Wires Are Seated. | | | | | |
| · . | | | | | | |
| Results Legend: | | | | | | |
| NI - No Ind | dications RI - Recordable Indication IO - Information Only | | | | | |
| | Recordable Indication Type Codes: | | | | | |
| A. Missing Wires | H. Cracks O. Other (Expla | ain) | | | | |
| B. Missing Button Heads | 1. Pitting | | | | | |
| C. Protruding / Unseated Wires | J. Nicks, Gouges, Mechanical Damage K. Uneven Shim Stack | | | | | |
| D. Broken Wires E. Active Corrosion | K. Uneven Shim Stack L. Excessive Shim Gaps | | | | | |
| F. Other Corrosion | M. Gasket Seating Surface Damage | | | | | |
| G. Evidence Of Free Water (Quantify | (y) N. Surface Discontinuities, Deflections | | | | | |
| Supplemental Information : XYes XNo Sketch Photo Video Other (Describe): | | | | | | |
| 15 | 274 ³ Results: Acceptable XYes No | | | | | |
| EXAMINER/EVALUATOR | TI TI | | | | | |
| (Print & Sign) Timothy C. G. bson | May C. Cross LEVEL _1/ DATE 10-07- | \overline{v} | | | | |
| (Print & Sign) | n Johnson M DATE 10/20/2010 | | | | | |
| and the second | ted only if Examiner/Evaluator notes RI or Unacceptable condition. | | | | | |
| RI or Unacceptable results Accept | table Yes No | | | | | |
| Additional Actions: | | | | | | |
| Additional Actions. (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | | | | | |
| LEVEL III or RI REVIEW (as applicab) | DATE: | | | | | |
| ANII REVIEW (as applicable) | seeph Shelly DATE 11-4-10 | | | | | |
| | | | | | | |

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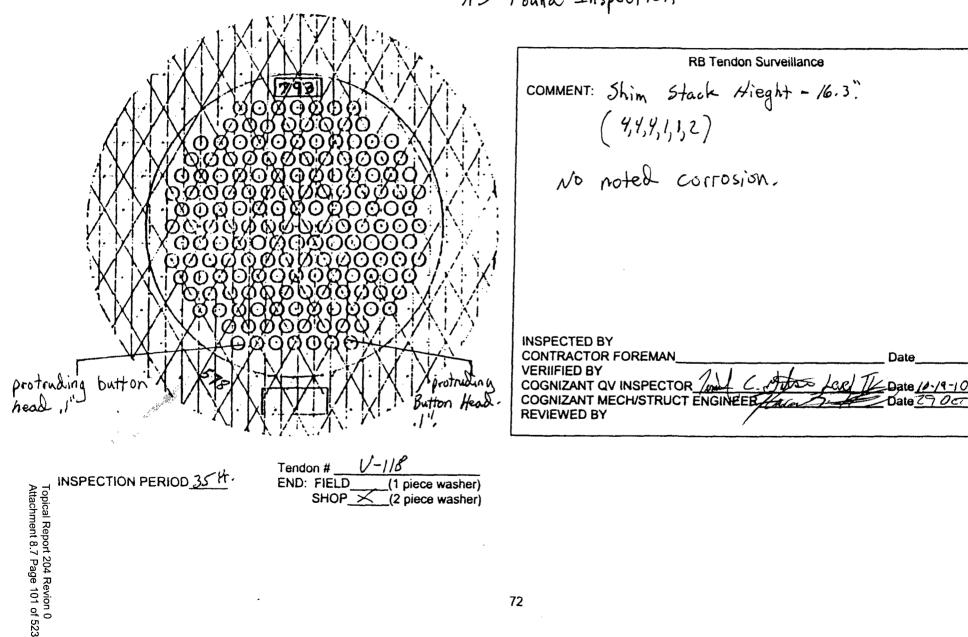
| ATTACHMENT 6 | | | | | |
|--|---------------------------------|------------------------------|--|--|--------------------|
| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE | | | | | |
| Report | | | | | |
| Station: TMT Unit: 1 | Page 1 | | Pon | ort No: | MA |
| | Date: | 10-19-10 | | | |
| System: Containant Component: Concret | | | | No(s).: g : | 1139507 |
| Location: Building: Containment Elev.: 456-2" Col.: 1/4 Row: 1/4 Azimuth/Radius: | | | | | |
| | | Of Exam: A | | e Matl | Type: Concrete |
| Design Drawing(s) TMI 1-0016 | Visual | | الجريب النامد فاغمصن فاعتمارها فقاع وبستان ويعتف وجمعت وتبرعت الكلاف | | 7.40 |
| M&TE Used: steel Rule 6-28-1) Test | | e / Compone or Serial No. | ents Coated: | | VO ue Date: */A |
| Illumination Used Sport Light | | umination Ve | | | Time: 12:10 PM |
| Special / Specific Instructions: | | | Juliou. Duto. 7 | / 1] /0 | 11110-16-90 11 |
| Component / Item Number and | RESUL | - | | nation / No | |
| Description (e.g. EIN, EID, etc.) | NI RITYP | | a minimum, Record ordable Indications | | |
| V-118 Area 24" around | | N | 'o indicat | inas | |
| anchore plate. | / | | in the cur | | |
| Shop Top end. | | | | | |
| 2 mon / 1000 cites i | | | | | |
| | | | | | |
| | | | | | |
| | | | | | 1 |
| | | ults Legend: | | | |
| NI - No Indicatio | | dication Type C | n 10 – Information (Codes: | Only | |
| A. Cracks (Characterize and Size) G. | Settlements Or | Deflections | M. Scaling | / Dusting | |
| B. Exposed Reinforcing Steel H. C. Exposed Metallic Items (Other) I. | Degraded Patc Popouts , Void | | | g Deterioration, Cavitation | |
| D. Evidence Of Grease Leakage J. | Spalls | s, noneycomo | | ds / Bug Hol | |
| E. Evidence Of Moisture K. | Cold Joint Line | | Q. Efflores | | |
| F. Leaching Or Chemical Attack L. | Corrosion Stair | | | Explain) | , |
| Supplemental Information : Yes XNo | Sketch | | Video Other (D | escribe): | |
| EXAMINER/EVALUATOR | esults: Acceptal | ble V e | s No | | |
| (Print & Sign) Timothy C. Gibson | Alto | | _ LEVEL | TL C | ATE 10-19-10 |
| STATION/ADMIN REVIEW | it. (c | | | DATE 1 | 0/29/2010 |
| (Print & Sign) Even J This section to be completed o | oman W | Nor/Evaluata | r noton Plan IIn | | |
| · · · | • | | • | And and a second se | le condition. |
| RI or Unacceptable results Acceptable Additional Actions: | Yes [|] No | No | | |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | | | | |
| LEVEL III or RE REVIEW (as applicable) | | | | | |
| ANII REVIEW (as applicable) 90 Acre | h Sthell | ý | | DATE: 1 | 1.410 |
| V | Page _ | _ of _[| | | |

ER-AA-335-018

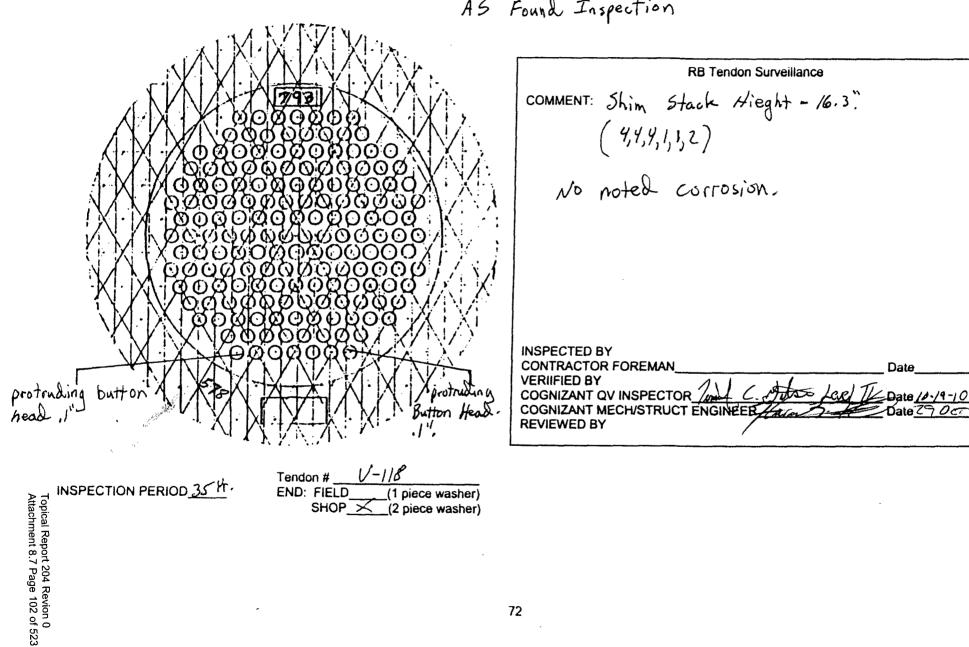
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| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE | | | | | |
|---|--|--|--|--|--|
| Report Page 1 of 1 | | | | | |
| Station: TMI Unit: 1 Date: 10-19-10 | Report No: MA | | | | |
| System: Tendon's Component: Concrete 24" a round anchur 1 | He U-118 WO NO(5): R 2139507 | | | | |
| Location: Building Containment, Elev. Gallery Col. 1 | A Row: MA Azimuth/Radius: | | | | |
| Exam Type: DV DGV XVT-10 XVT-3C 4 ype Of Exam: | Direct Remote Matl. Type: Concrete | | | | |
| Design Drawing(s) TAI 1-0016 200, 10-000 Visual Aids: A | | | | | |
| Surface: ID (OD) Surface / Components Coated: YES YO | | | | | |
| M&TE Used: Steel Aule R-226-13-11 Test Card UTC or Serial I Illumination Used Flash Land Illumination | | | | | |
| Special / Specific Instructions: 1// | n Verified: Date: 10-19-10 Time: 2:00 AM | | | | |
| Component / Item Number and RESULTS Description NI RI TYPE IO | Explanation / Notes (As a minimum, Record Location and Size of Recordable Indications as applicable) | | | | |
| Concrete Areazy"around anchor plate V-118 Field end. | NO Indications | | | | |
| anchor plate V-118 Field | | | | | |
| end | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | ' | | | | |
| Results Legenc NI - No Indications RI - Recordable Indi | I: cation IO – Information Only | | | | |
| Recordable Indication Ty | | | | | |
| A. Cracks (Characterize and Size) G. Settlements Or Deflection B. Exposed Reinforcing Steel H. Degraded Patches or Rep | v v | | | | |
| B. Exposed Reinforcing Steel H. Degraded Patches or Rep C. Exposed Metallic Items (Other) I. Popouts , Voids, Honeyco | | | | | |
| D. Evidence Of Grease Leakage J. Spalls | P. Air Voids / Bug Holes | | | | |
| E. Evidence Of Moisture K. Cold Joint Lines F. Leaching Or Chemical Attack L. Corrosion Staining | Q. Efflorescence R. Other (Explain) | | | | |
| Supplemental Information : Yes INo Sketch Photo | Video Other (Describe): | | | | |
| Results: Acceptable | | | | | |
| EXAMINER/EVALUATOR | LEVEL I DATE 10-19-10 | | | | |
| (Print & Significative Gibson / CALIND | | | | | |
| (Print & Sign) Even Johnson W | DATE 10/20/2010 | | | | |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | | | | | |
| RI or Unacceptable results Acceptable 🗌 Yes 🗌 No | | | | | |
| Additional Actions: | | | | | |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | | | | |
| LEVEL III or RE REVIEW (as applicable) | DATE: | | | | |
| ANII REVIEW (as applicable) forech Alberty DATE: 12-1-10 | | | | | |
| Page _/_ of _/_ | · · · · · · · · · · · · · · · · · · · | | | | |

ENCLOSURE 6 Data Sheet 4 **Tendon Buttonhead Inspection** AS Found Inspection



ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection AS Found Inspection



1301-9.1 **Revision 21** Page 9 of 16 **ENCLOSURE 6 Data Sheet 4** Tendon Buttonhead Inspection As left post retensioning 1 wire removed for testing 10-26-2010 **RB** Tendon Surveillance COMMENT: Shim stack ht. 17.5" $(4,4,4,2,1,\frac{1}{4},\frac{1}{2},\frac{1}{2},1)$ 166 effictive wires. 000000000**INSPECTED BY** Date CONTRACTOR FOREMAN **VERIIFIED BY** Date 10-26-10 Date 29 001 COGNIZANT QV INSPECTOR W. 9 COGNIZANT MECH/STRUCT ENGINEER **REVIEWED BY** 2 Wires found to be broken after de tensioning removed and turned over to the Client. Tendon # _____(1 END: FIELD_____(1 INSPECTION PERIOD 35 V. AS (1 piece washer) SHOP / (2 piece washer) 72

Topical Report 204 Revion 0 Attachment 8.7 Page 103 of 523

Revision 21 Page 9 of 16 **ENCLOSURE 6** Broken Wire Pulled 10-26-10 Protruding wire .060" Data Sheet 4 Tendon Buttonhead Inspection Post Retension **RB** Tendon Surveillance COMMENT: Shim Stack Hieght - 4.1" (4") rosten wire illed 1025-10 Θ No Corrosion. (\cdot) MI Test Nive. **INSPECTED BY** CONTRACTOR FOREMAN Date **VERIIFIED BY** COGNIZANT QV INSPECTOR Date/0-267/0 COGNIZANT MECH/STRUCT ENGINEER Pulled **REVIEWED BY** +esting 10-26-76 V-18 Tendon # _ INSPECTION PERIOD 35 END: FIELD × (1 piece washer) Topical Report 204 Revion 0 Attachment 8.7 Page 104 of 523 SHOP (2 piece washer) 72

1301-9.1

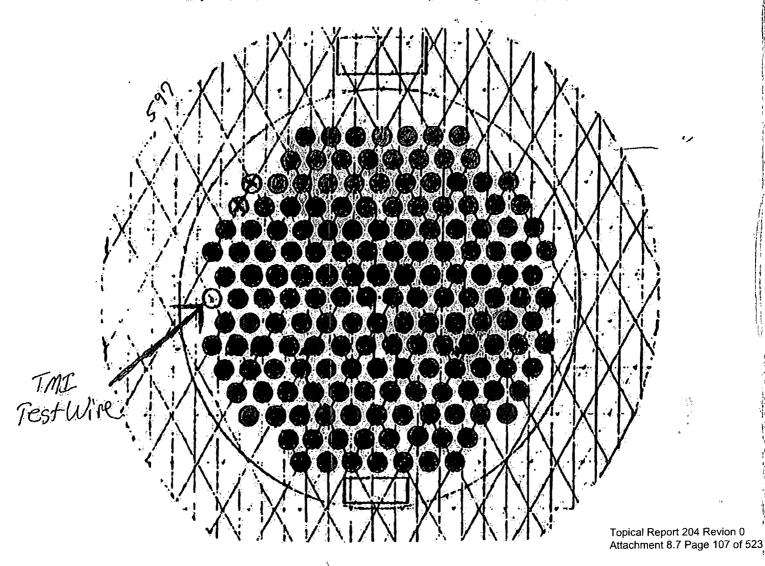
1301-9.1 **Revision 21** Page 9 of 16 **ENCLOSURE 6** Data Sheet 4 Tendon Buttonhead Inspection AS IEH post retension × 1 wire removed for testing 10-26-2010 **RB** Tendon Surveillance COMMENT: Shim stack ht. - 16.1 " (4,4,4,1,1/4,1/2,1/2,1/2,1/8,1) 00 166 wires serted \mathbf{O} X This is the second re-tension. The shim stack was to tall after the first. **INSPECTED BY** CONTRACTOR FOREMAN Date **VERIIFIED BY** COGNIZANT QV INSPECTOR -Bate/0-27-10 COGNIZANT MECH/STRUCT ENGINEER **REVIEWED BY** INSPECTION PERIOD 35 %r. AS END: FIELD ____(1 piece washer) SHOP____(2 piece washer) 2 wine found to be broken after detensioning removed and turned over to the client.

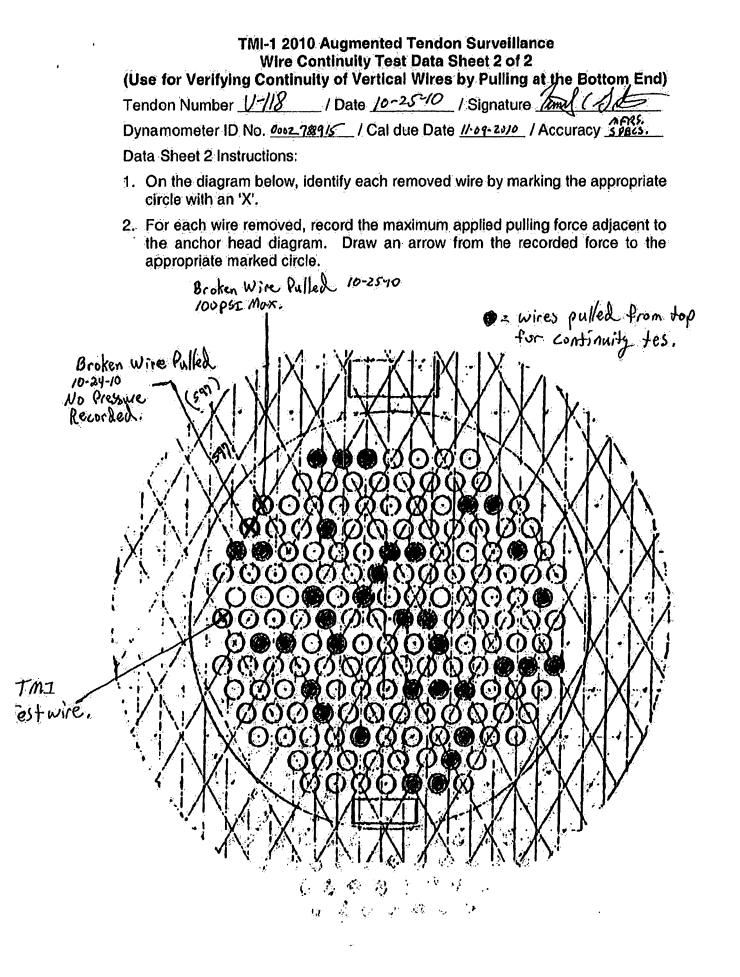
•

TMI-1 2010 Augmented Tendon Surveillance Wire Continuity Test Data Sheet 1 of 2

(Use for Verifying Continuity of Vertical Wires by Pulling at the Bottom End) Tendon Number 1/-1/8 / Date 10-25-2010 / Signature 10-2010 / Dynamometer ID No. 0002788915 / Cal due Date 11-09-2010 / Accuracy MFR. Specs, Data Sheet 1 Instructions:

- 1. Connect pulling device with in-line dynamometer to each wire in sequence.
- 2. Increase pulling force until dynamometer indicates between 5,500 and 6,000 lb. DO NOT EXCEED A PULLING FORCE OF 6,000 LB.
- 3. If pulling force will not reach 5,500 lb, wire is broken. Remove in one piece and store against inside wall of the tendon gallery. Record on Data Sheet 2 the maximum pulling force applied to the removed wire.
- 4. If continuity is verified, blacken the appropriate circle in the anchor head sketch below.
- 5. If wire is broken and removed, mark the appropriate circle with an 'X '.
- 6. If wire is removed for a surveillance test sample, mark the appropriate circle with a single slash.
- 7. Identify the short test wire with an arrow pointing to the appropriate circle.





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PSC PROCEDURE SQ 7.1 INSPECTION DOCUMENTATION DATA SHEET 7.1 July 31, 2009 Page 1 of 1 Revision 0

:

| Tén | ject: <u>TMI – 3</u> idon No.: chorage ID.: <u>2</u> | V-I | | | | ind/Bultress No.: | 5 | ·p | | |
|-----|---|----------------|------------------------------|--|-----------------|--|----------|--------------|--------------------------|---------------------------|
| | EQUIPMENT | | | METER | | WIR | ΪE | | SHIN | IS : |
| | Thread | MI | c ID | Reca | l Date | ID No. | Recal Da | te LO | No. | Recal Date |
| | Ext. Major | QC | 52 | 4.5 | -11 | | | | | |
| | Ext. Pitch | QC | 52 | 4-5- | -1/ | Set 5 | 6-25-1 | 1 Su | c 1 1 | 7-25=10 |
| | Ext. Minor | QC | 52 | 4-5- | 1/ | Davk Red / Blue | 12+25-10 | | | 12-25210 |
| | Int. Major | N | 1/A · | 'N | • | | | | | |
| | Int. Minor | N | I/A | Ń | ΪĄ | | | | | |
| [| MEASUREME | INTS | T | THREAD |) [.] | | Wire | Wire | Shim | Average |
| | Thread | Read | 3 rd | 8 th | 9 th | Average | Constant | Diameter | Size | Diameter |
| 185 | Ext. Major | 1 2 | 9,323 9.372 | 9.372 9.373 | 9.372 | | | | | 9.3.72 |
| | Ext. Pitch (1) | 1 2 | 9.538 | 的效应 | 9.539 | 9,517 540 | .254 | | . 032 | 9.231 |
| | Ext. Minor (2) | 1 2 | 9.458 | | 9.457 9.457 | 9.456 | | (120) 240 | .032 | 9.184 |
| | Int. Majõr | 1 2 | N/A N/A | | N/A N/A | | | | | |
| | ' Int. | 1 | N/A | N/A | N/Ä | | | | | |
| } | Minor | 2 | N/A | N/A | N/A | | | | | |
| | lnt. Bilch | ₂ , | Gauge ID: Go Gauge ID: | | · | Recal Da | | | Result: Result: | N/A N/A |
| Nol | | Minor Dia | meter = (| | | Constant) – (Shim Siz Mre Diameter) – (Shir | | | | |
| | | | | | Adapto | Mark 02 | Trial 2 | Trial 3 | Trial | 4 |
| | | Min. N | Ainor Dian | بروين اليبيهة ويور التكابية الخاص التلية | | and the second | | | | |
| οċ | Signoff: | AI | X M | | e? (Yes | br No) <u>Yes</u> Level: - | l | Date: | | |
| . , | Reviewed: | W. Pa | V is the | Pall | 1 | | The | Date: | <u>D-M-10</u> 10-27-1 | 0 |
| Ø | | | | | | | | · · · · · | | an gant dan sa pangungkan |
| | a a companya da sua companya a companya a companya da sua da s | | | | | | | | | <u></u> |

19 SQ 7.1.TM:09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 109 of 523

| | | | | DATA SHE Lift-Off Force Me | | | 1301-9.1 Revision 21 Page 1 of 1 | |
|---|--|--|---|-------------------------------|---|--|--|--|
| Surveillance | No. 35 th. Yr. | Tendon ID <u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u> | Pred | licted Force (Fp) | <u>340 kip</u> | Tendon End (Cir | rcle One). Shop / Field | |
| Phase (Circle | One) As-found/ | Re-Tension | Ram ID <u>941</u> | 00 | Ram Calibra | tion Constants: A = 23 | <u>5.787</u> k = -6.96/ | |
| Date <u>/0-/9-/</u> | o Temp: F | RB Interior /09 °I | - / Concrete Surfac | ж <u> 18</u> °F | No. Effective | Wires, N _w 169 S | Shim Stack Ht. <u>16.3</u> in. | |
| | CAUTION DO NOT EXCEEP A RAM PRESSURE OF [(1,592 x N _w / 169) – k] x 1,000 / A = $6[8] \cdot 37$ psig | | | | | | | |
| Trial 1 2 3 4 5 6 7 8 9 10 | Lift-Off Pressure, psig 59:20 59:20 59:20 | Consecutive Three Trial Pressure Spread psi N/A N/A O | Consecutive Three Trial Pressure Average p ¹ psig ^{1,2} <u>N/A</u> <u>N/A</u> <u>sr</u> 22 D | At Feeler Gage | At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | ner Rotation Rotation, Turns CW or CCW 1,000) = k = <u>13653/</u> ki | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead | |
| ² Re-tension F For Re-Tensi Notes: | P range: P'min = (Fp | Lift-Off Force < 1394 | 2_psig < P' < P'm x N _w / 169; | 1/A < | <u> </u> | 00 / A = <u>/A</u> psig <u>A</u> Yes / No <u>W</u> <u>Rimce</u> <u>Rol</u> QV | (Circle One) | |

.

| | | | | DATA SHEET 1 Lift-Off Force Measurement | | 1301-9.1 Revision 21 Page 1 of 1 | |
|---|---|--|--|--|---|---|--|
| Surveillance N | 10.35 th | Tendon ID <u>V-118</u> | Predic | cted Force (Fp) <u>1340 kip</u> | Tendon End (Ci | rcle One): Shop)/ Field | |
| 1 | One): As-found / | Re-Tension | Ram ID <u>940</u> | Ram Calibrat | ion Constants: A = <u>2</u> | 35.787 k= -6,961 | |
| Date 10-27-2 | ZOID Temp: F | RB Interior 115 °F | / Concrete Surface | 2 <u>69</u> °F No. Effective | Wires, N. <u>166</u> | Shim Stack Ht. <u>16, 1</u> in. | |
| | CAUTION DO NOT EXCEEP A RAM PRESSURE OF $[(1.592 \times N_w / 169) - k] \times 1,000 / A = 6661.52 psig$ | | | | | | |
| Trial | Lift-Off Pressure, psig | Consecutive Three Trial Pressure Spread psi | Consecutive Three Trial Pressure Average p ¹ psig ¹² | Stressing Was | ner Rotation Rotation, Turns CW or CCW | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead | |
| 1 2 3 4 5 6 7 8 9 | <u>5720</u> <u>5720</u> <u>5720</u> | N/A N/A 6 | N/A N/A 5720 | At Freeler Gage Insertion At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | | $ \begin{array}{c} 1 \\ \frac{1}{1/2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{4} \\ \frac{1}{4} \\ \end{array} $ | |
| .9 10 | | | · · | End Lift-Off Force = (A x P' / | 1,000) = k = <u>1341.74</u> k | ip4 | |
| ¹ N/A if 3 trial t | pressure spréad > | 25,000 / A = <u>106.02</u> | psi | | | | |

ų,

Notes: NONE

(Yes) No (Circle One)

OV

Date /0-27-10

² Re-tension P range: P'min = (F_P - k) x 1,000 / A = <u>57/2.61 psig</u> < P' < P'max = [(1,394 x N_w / 169) - k] x 1,000 / A = <u>5836.68</u> psig

For Re-Tension Only: Fp < End Lift-Off Force < 1394 x Ny / 169; 1340 < 1341.74 < 1369.25

Recorded by: Signature W. Panco Rolling Date 10-27-10 / Reviewed by: Signature

| | | | | DATA SHEET 1 Lift-Off Force Measurement | | 1301-9.1 Revision 21 Page 1 of 1 |
|--------------------------------------|---|--|--|---|---|--|
| Surveillance I | No. 35 4 | Tendon ID V-119 | <u>}</u> Pred | cted Force (Fp) 1340 kip | Tendon End | (Circle One) Shop / Field |
| Phase (Circle | One): As-found /(| Re-Tension | Ram ID 94 | CO Ram Calibra | tion Constants: A = | 235.787 K=-6.961 |
| Date 10-26 | r/O Temp: F | RB Interior 114 of | / Concrete Surfac | e <u>60</u> °F No. Effective | Wires, N. 166 | Shim Stack Ht. <u>17.5</u> in. |
| | 1 | DO NOT EXCEEP A R | AM PRESSURE O | CAUTION F [(1.592 x N _w / 169) - k] x 1.00 | 014 = 6661.40 | psig |
| Trial | Lift-Off Pressure, psig | Consecutive Three Trial Pressure Spread psi | Consecutive Three Trial Pressure Average p ¹ psig ¹² | Stressing Was | her Rotation Rotation, Turns CW or CCW | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead |
| 1 2 3 4 5 6 7 8 | <u>5780</u> <u>5780</u> <u>5760</u> | N/A N/A 0 | N/A N/A 5780 | At Feeler Gage Insertion At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | | $ \begin{array}{c} $ |
| 8 9 10 | | | ······································ | End Lift-Off Force = (A x P | / 1,000) = k = <u>/355</u> , | <u>\$8 kip</u> 4* |

N/A if 3 trial pressure spread > 25,000 / A = 106,02 psi

Recorded by: Signature 1. Lance Tel

² Re-tension P range: P'_{min} = (F_p - k) x 1,000 / A = <u>57(2.61</u> psig < P' < P'_{max} = [(1,394 x N_w / 169) - k] x 1,000 / A = <u>5830.69</u> psig For Re-Tension Only: F. < End Lift-Off Force < 1394 x N. / 169: 1340 < 1355.86 < 1369.25 Yes No (Circle One) Notes: NONE

Date 10-27-10 / Reviewed by: Signature //m

29

Date 10-27-10

| | | | | n fan de sen an de sen fan ê anna sen a sen | | CEDURE SQ10. WIRE REMOVAL Data Sheet 10. July 31, 2000 Page 1 of Revision (|
|--|--|--------------------------------|--|--|---|--|
| Project: TMI | 35TH YEAR TENDO | N SURVEILLANCE | | ۲ | ÚNIT 1 | |
| Tendon No.: Removal Date: | V-118 10-26-10 | Tendon End Inspection Date: | - <u>Τορ</u> 10-26: | 2 IZ | ihop 🗌 Fi | əld |
| | | WIRE REM | OVAL INSPI | ECTION | | |
| (8.5.4.1.1) Docume For Corrosion Leve | el E document conditio | jory for each 10' of wire | N | nts below. Use Catego ICR Req'd: 🛛 🖄 NO Completed: | ries described in PS | NA |
| -X. | Sampk I | <u>}</u> | 1 | 20' | <u> </u> | 30' |
| 30' | 1 | 40' | 1 | | | 60' |
| 60' | | 70' | 1 | ŜΟ [;] | | 90' |
| | Sanglic | 100' | n ere server son | 110' | | 120' |
| 120' | | 130' | in the second se | 140! | | 150' |
| 150' | 934 689 8000 800 800 800 800 800 800 800 800 | | 1 | 170' | Sample 3_ | 180' |
| 180 +5 1 | 119 . A - 1051 | "total length | an a | 200' | m myan sunda bisangan satesang a | 210' |
| 210' | 1.00 - 1.82 | 220' | | 230' | 287 8 444 8 9 78 2010 900 9 - 40 8 70 1646 9 | 240' |
| 240' | аранат Ана, уч. 11, 14 сана анган Калана Ана а | 250' | | 260' | AR E MARGINE AND AND A SHOT AND | 270' |
| 270' | | 280' | nangur dalam ta'ing alan alguna garanta ng | 290' | | 300' |
| 300' | entre expressioned | 310' | | 320' | Cut End | 330' |
| (8.7) Document the | vice: $R - Z \int S He$ | ved on Data Sheet 8.0 | ANCHORAGE IN | | symbol × § Completed cal Date: <u>6-2</u> | 24-11 |
| Q.C. Inspector: | Panes Pable | Lovel | I | Date: | 10-26-20 | 10 |
| Reviewed | of CDit | <u> </u> | T | Date: | 10-21-20 | Ŵ |

| 1 | Solica Report 204 Revion 0 |
|---|--------------------------------|
| | Attachment 8.7 Page 113 of 523 |

,4 ·

Number

1301-9.1 **Revision No.**

DATA SHEET 4

Page 1 of 4

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Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons

TMI - Unit 1

Surveillance Procedure

Tendon ID V-118

Part 1 **Original Stressing Data**

NOTE

PTF force is that equivalent to a ram pressure of 1,000 psl. PTF removes tendon slack and is the starting point for elongation measurements. OSF force is 80% (may be less) of tendon ultimate strength. The tendon is loaded to OSF in order to provide the required force distribution. It is also the force at which final elongation is measured. PTF force / elongation, OSF force / elongation and number of effective wires are documented in construction records.

| Table 1 | | | | | |
|---------|--------|--|--------|--|--|
| | Value | Parameter | Row, R | | |
| kip | 199,2 | Shop End PTF Force | 1 | | |
| kip | N/A | Field end PTF force | 2 | | |
| kip | 199.2 | Mean PTF Force = (R1 + R2) / 2 | 3 | | |
| İn. | 3.8 | Shop End PTF Reference Distance | 4 | | |
| In | NA | Field End PTF Reference Distance | 5 | | |
| in | 3,8 | Net PTF Reference Distance: = R4 + R5 | 6 | | |
| ķiņ | 1581.9 | Shop End OSF Force | 7 | | |
| kip | NA | Field end OSF force | 8 | | |
| kiç | 15819 | Mean OSF Force = (R7 + R8) / 2 | 9 | | |
| in | 17.8 | Shop End OSF Reference Distance | 10 | | |
| In | NIA | Fleid End OSF Reference Distance | 11 | | |
| In | 17.8 | Net OSF Reference Distance = R10 + R11 | 12 | | |
| kip | 1382.7 | Differential Force = R9-R3 | 13. | | |
| İń | 14 | Differential Elongation = R12-R6 | 14 | | |
| | 169 | 5 Number of Effective Wires | 15 | | |
| | 171 | Elongation Rate = R14 x R15 / R13 | 16 | | |

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Surveillance No. 35 1/

RB Structural Integrity Tendon Surveillance

Tille

| | | TMI – Unit 1 Surveillance Procedure | | | | 13 | 01-9.1 | | |
|--------|---|--|--|--|----------|--------------|----------|--|--|
| Title | | | | | | Revision No. | | | |
| RB Str | RB Structural Integrity Tendon Surveillance 21 | | | | | | | | |
| | DATA SHEET 4 Page 2 of 4 Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons | | | | | | | | |
| Tendon | 10 V-118 | <u> </u> | | | Surveill | ance No. J | 5 Vr. | | |
| | | | Part 2 | | | | <i>t</i> | | |
| | | | Shop End Re-Tension | ing Data | | | | | |
| Ram ID | 9400 | | Ram Area, A <u>235,7</u> | <u>87</u> ln² | Ram k | -6,96(| _kip | | |
| | | | NOTE | | | | | | |
| | | number enter Identified in F | of effective wires entered in R1 red for the field end in Table 3. tows 4, 16, 18 & 19 (shaded) m ends of the tendon is complete. | Also, the calculay be done aft | lations | | | | |
| | | | Table 2 | | | | | | |
| | Row, R | · · · | Parameter | Value | Sig | nature | Date | | |
| | · 1 | | Number of Effective Wires | 166 | WRF | 2 | D-26 | | |
| | 2 | | PTF Target Pressure | 1,000 psi | WE | 22 | 10.26 | | |
| | 3 | | PTF Actual Pressure | 860 psi | | e R | 10-26 | | |
| | 6 | | entilizofear a freix/s/0007-1 | 18 5 5 0 10 | 國際 | REAL S | 1026 | | |
| | 5 | | PTF Reference Distance | 5,0 In. | W | RR | 10.26 | | |
| | 6 | 08 | F Maximum Force = R1 x 9.4 | 1560.4 kip | N | RR | 10-26 | | |
| | 7 | OSF Max | . Pressure = 1000 (R6 + k) / A | 6647.39sl | W | RL | 10-26 | | |
| | 8 | 1/3 Pr | essure Interval = R7/3-330 | 1885,78psi | W. | RZ | 10.26 | | |
| | 9, | Ta | rget 1/3 Pressure = 1,000 + R8 | 2885.78 psi | N. | RK. | 1026 | | |
| | 10 | | Actual 1/3 Pressure | 2.790 psi | Net | 017 | 10-26 | | |
| | 17 | · | 1/3 Reference Distance | 9.4 in. | NK | ?L | 10.26 | | |
| | 12 | T | arget 2/3 Pressure = R9 + R8 | 4-771,56 psi | Ŵ | ek . | 10-26 | | |
| | 13 | | Actual 2/3 Pressure | 4700 psl | W | RE | 10-26 | | |
| | 14 | 4 | 2/3 Reference Distance | 14 in. | W | RR | 10-26 | | |
| | 15 | | OSF Actual Pressure | 6640 psi | W | 'RK | 10-26 | | |
| | 1 | Sectors Pres | Delleorce is is deve/Allood at | 15.5676100 | | | 1026 | | |
| | 17 | | OSF Reference Distance | | W | RR | 10-26 | | |
| | 61.916 | | DIRECTION FOR THE STATE | 18/229200 | | KI S | 18224 | | |
| | 19 | I BM STORE FRANKSOLD STORES | Tentralizion dallon da 1802/04/Re | 1 120 1/20 20 20 20 20 20 20 20 20 20 20 20 20 2 | No. IA | RR SS | 1622 | | |

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Number

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TMI - Unit 1 Surveillance Procedure 1301-9.1 **Revision No. RB Structural Integrity Tendon Surveillance** 21

DATA SHEET 4 Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons

Tendon ID 1-118

Tille

Part 4 **Elongation Comparison**

| | Table 4 | |
|--------|---|--------------|
| Row, R | Parameter | Value |
| 1 | Shop End Differential Force from Table 2, R18 | 1362,92kip |
| 2 | Field End Differential Force from Table 3, R18 | N/A kip |
| 3 | Average Differential Force = (R1 + R2) / 2* | 1362,92 kip |
| 4 | Shop End Differential Elongation from Table 2, R19 | 13,5 in. |
| 5 | Field End Differential Elongation from Table 3, R19 | NIA In. |
| 6 | Total Elongation = R4 + R5** | 13,5 in |
| 7 | Number of Effective Wires from Table 2, R1 | 166 |
| .8 | Re-Tensioning Elongation Rate = $R6 \times R7 / R3_{\mu}$ | NPP 2,631,64 |
| .9 | Original Elongation Rate from Table 1, R16 | 1.7 |
| 10 | Fractional Difference in Rates = (R8 - R9) / R9 | .0410 |

Absolute value of the above Fractional Difference in Rates ≤ 0.1

* For vertical tendon = R1

** For vertical tendon = R4

Signature: W, Ednes Polle

10-27-10 Date:

Yes

No

Page 4 of 4

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Surveillance No.

Number

TMI - Unit 1 1301-9.1 Surveillance Procedure Revision No. **RB Structural Integrity Tendon Surveillance** 21

DATA SHEET 4

Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons

Tendon ID V-118

Tille

Part 1 **Original Stressing Data**

NOTE

PTF force is that equivalent to a ram pressure of 1,000 psi. PTF removes tendon slack and is the starting point for elongation measurements. OSF force is 80% (may be less) of tendon ultimate strength. The tendon is loaded to OSF in order to provide the required force distribution. It is also the force at which final elongation is measured. PTF force / elongation, OSE force / elongation and number of effective wires are documented in construction records.

| | Table 1 | , | |
|--------|--|--------|-----|
| Row, R | Parameter | Value | |
| 1 | Shop End PTF Force | 199.Z | kip |
| 2 | Field end PTF force | N/A | kip |
| 3 | Mean PTF Force = (R1 + R2)/2 | 199,2 | klp |
| 4 | Shop End PTF Reference Distance | 3,8 | ln. |
| 5 | Field End PTF Reference Distance | N/A | ln. |
| ß | Net PTF Reference Distance = R4 + R5 | 3,8 | lń. |
| 7 | Shop End OSF Force | 1581.9 | kip |
| 8 | Field end OSF force | NA | kip |
| 9 | Mean OSF Force = (R7 + R8) / 2 | 1581.9 | kip |
| 10 | Shop End OSF Reference Distance | 17.8 | ln. |
| 11 | Field End OSF Reference Distance | NA | In. |
| 12 | Net OSF Reference Distance = R10 + R11 | 17.8 | In. |
| 13 | Differential Force = R9 - R3 | 1382.7 | kip |
| 14 | Differential Elongation = R12 - R6 | 14 | in. |
| 15 | Number of Effective Wires | 169 | |
| 16 | Elongation Rate = R14 x R15 / R13 | 1.71 | |

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th vr. Surveillance No. 35

Number

Page 1 of 4

| RB Str | uctural Ir | | 21 | | | | | |
|--------|------------|--|--|------------------|--|--|--|--|
| • | | 19 | Page 2 of 4 | | | | | |
| Tendon | 10 V-114 | \$ | s | lurveillance | No. 35 Vr. | | | |
| | | Part 2 | | | | | | |
| | | Shop End Re-Tensioni | ng Data | | | | | |
| Ram ID | 9460 | Ram Area, A 235.78 | 7_in ² 1 | Ram k <u>-61</u> | <u>761 kip</u> | | | |
| | | NOTE | | | 7 | | | |
| | | number entered for the field end in Table 3. | The number of effective wires entered in R1 must be the same as the number entered for the field end in Table 3. Also, the calculations identified in Rows 4, 16, 18 & 19 (shaded) may be done after stressing work at both ends of the tendon is complete. | | | | | |
| 1 | | Table 2 | | | | | | |
| | Row, R | Parameter | Value | Signature | Date | | | |
| | 1 | Number of Effective Wires | 166 | WRR | 10-27 | | | |
| | 2, | PTF Target Pressure | 1,000 psi | WRR | | | | |
| | 3 | PTF Actual Pressure | 866 psi | WRR | 10-27 | | | |
| | 24 A | an an interaction pole and repair and an | 派的通知 | 13 W K E | 8 11 10 20 | | | |
| | 5 | PTF Reference Distance | 4.5 In. | WRR | 10.27 | | | |
| • | Ð | OSF Maximum Force = R1 x 9.4 | 1560.4 kip | WRR | 10-27 | | | |
| | 7 | OSF Max. Pressure = 1000 (R6 + k) / A | 6647.35 psi | WRR | | | | |
| | 8 | 1/3 Pressure Interval = R7 / 3 - 330 | 1885.78 psi | WRR | 1 | | | |
| | 9 | Target 1/3 Pressure = 1,000 + R8 | 2885.78 psi | WRR | | | | |
| | 10 | Actual 1/3 Pressure | 2790 psi | WRR | | | | |
| | 11 | 1/3 Reference Distance | 8,8 in. | WRR | 10.27 | | | |
| | 12 | Target 2/3 Pressure = R9 + R8 | 4771,56 psi | NRR | 10-27 | | | |
| | 13 | Actual 2/3 Pressure | 4700 psi | WRR | 10-27 | | | |
| | 14 | 2/3 Reference Distance | 13,5 in. | WRR | 10-27 | | | |
| | 15 | OSF Actual Pressure | 6640 psi | WRF | | | | |
| | 16 | JOSEACULIEOCONE RIEXAMODIUSK | ISS STORE | N WAL | 10.27 | | | |
| | 17 | OSF Reference Distance | 18.5 m. | WRR | 10-27 | | | |
| | | Contraction and Borease (1908-184 | BEZ TALE | WAR A | 1566 (State State | | |
| | 19 | A PART PURCHURIE OF GRIOT PURCHASERS | WHAR CO. | soviele. | | | | |
| | | | | | | | | |

TMI - Unit 1 Surveillance Procedure

1301-9.1 Revision No.

Number

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Title

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Absolute value of the above Fractional Difference in Rates < 0.1

Signature: W. Pance Colle-

* For vertical tendon = R1

** For vertical tendon = R4

10-27-2010 Date:

Re-Tensioning Data for De-Tensioned Tendons Surveillance No

| Pa | <u>irt 4</u> |
|------------|--------------|
| Elongation | Comparison |

DATA SHEET 4

Elongation / Tendon Force Record

| | Table 4 | |
|--------|---|-------------|
| Row, R | Parameter | Value |
| 1 | Shop End Differential Force from Table 2, R18 | /362.92 kip |
| 2 | Field End Differential Force from Table 3, R18 | N/A kip |
| 3 | Average Differential Force = (R1 + R2) / 2* | 1362,92 kip |
| 4 | Shop End Differential Elongation from Table 2, R19 | 14 in. |
| 5 | Field End Differential Elongation from Table 3, R19 | N/A in. |
| 6 | Total Elongation = R4 + R5** | 14 In. |
| 7 | Number of Effective Wires from Table 2, R1 | 166 |
| 8 | Re-Tensioning Elongation Rate = R6 x R7 / R3 | 1.70 |
| 9 | Original Elongation Rate from Table 1, R16 | 671 |
| 10 | Fractional Difference in Rates = (R8 - R9) / R9 | 20- |

Tendon ID V-118

Title

TMI - Unit 1 Surveillance Procedure 1301-9.1 **Revision No. RB Structural Integrity Tendon Surveillance** 21

Number

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Yes_V

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| RS5 | > | | | PSC PROCEDURE SQ 12. REPLACE GREASE CAI Date Sheet 12. July 31, 200 Page 1 of Revision |
|-------------|---------------------------------|------------------------------|--------------|---|
| Project: T | VI 35 TH YEAR TENDON | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| Tendon No.: | V-118 | Tendon End: Top | | Field |
| | | ANCHORAGE INSPECTION CRI | TERIA | |
| | BEARING PLATE SU | RFACE PROPERLY PREPARED: | I YES | |
| | i ditiya ditarit a s | ACE PROPERLY PREPARED: | I YES | |
| | GASKET MATING SU | JRFACE PROPERLY PREPARED: | 12 YES | |
| | STUD/BOLT HOLES | PROPERLY PREPARED | 1 YES | |
| | FOREIGN MATERIAL | EXCLUSION CONTROLLED | VES | NO |
| | COMMENTS | L | | |
| | <u> </u> | | | |
| | | | | |
| | | | | |
| | 1 | $\partial + \wedge + \wedge$ | | |
| CREW FORE | | mallin y | | Date: 10-27-10 |
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25 SQ 12.0 TM:09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 120 of 523

| RSG | <u>،</u> | | | | PSC PROCEDURE SQ REPLACE GREASE (Data Sheet July 31, 2 Page 1 Revisi |
|-------------------|---------------------------------------|-------------------|---------------|--|--|
| Project: <u>T</u> | MI 35 TH YEAR TEND | ON SURVEILLANCE | | ng Canada San Ang Ang Ang Ang Ang Ang Ang Ang Ang An | n an |
| Tendon No. | V-118 | Tendon End: | Bott om | Shop | Field |
| | · · · · · · · · · · · · · · · · · · · | ANCHORAGE IN | SPECTION CRIT | ERIA | |
| | BEARING PLATE | URFACE PROPERLY | PREPARED: | YES | |
| | GREASE CAP SUP | RFACE PROPERLY PR | REPARED: |) TYES | |
| | GASKET MATING | SURFACE PROPERLY | PREPARED: | ∕∕⊠TYES | |
| | STUD/BOLT HOLE | S PROPERLY PREPA | RED: | YES | |
| | FOREIGN MATERI | AL EXCLUSION CONT | ROLLED: | ∑ -YES | |
| | COMMENTS No | n & | ····· | | |
| | | | | · · · · · · · · · · · · · · · · · · · | |
| | | | | | |
| | | | | | <u></u> |
| CREW FORE | | 1/2/10/0 | 11/- | | Date: <u>10-27-1</u> |
| QC Reviewe | d: Amax | C. Ha | Level: | _TI | Date: 10-2,8-1 |

25 SQ 12.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 121 of 523

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PSC PROCEDURE SQ 12:1 GREASE REPLACEMENT Data Sheet 12.1b - Hand Pumping July 31, 2009 Page 1 of 1 Revision 0

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| GREASE REPLACEMENT 4) Grease Used Image: NEW OLD - TEST DATE: Image: Acceptable PREREQUISITES 5) Total Grease Loss from Data Sheet 6.0 for $\frac{Shop}{Top}$ tendon end: 6) Total Grease Loss from Data Sheet 6.0 for $\frac{Shop}{Top}$ tendon end: 6) Total Grease Loss from Data Sheet 6.0 for $\frac{Shop}{Top}$ tendon end: Total Grease Loss from Data Sheet 6.0 for $\frac{Shop}{Top}$ tendon end: Total Grease Loss from Data Sheet 6.0 for $\frac{Field}{Gallery}$ tendon end: Total Grease Loss from Data Sheet 6.0 for $\frac{Field}{Gallery}$ tendon end: Total Grease Loss from Data Sheet 6.0 for $\frac{Field}{Gallery}$ tendon end: Total Grease Loss from Data Sheet 6.0 for $\frac{Field}{Gallery}$ tendon end: Total Grease Loss from leaks for $\frac{Shop}{Top}$ tendon end: Distimated grease losses from leaks for $\frac{Field}{Gallery}$ tendon end: Distimated grease Loss: O POURING AND HAND PUMPING – FIRST END 6) Ambient Temp:: $\underline{7}$ °F Thermometer ID: $\frac{P(FIDZ)}{P(FIDZ)}$ Recal Data | $\square APPROVAL LETTER DATED: 5.5 gal. 6 gal. 0 gal. 0 gal. 11.5 gal.$ | QC SIGNOFF WELIO-27-1 WELIO-27-1 WELIO-27-1 |
|---|---|--|
| PREREQUISITES 5) Total Grease Loss from Data Sheet 6.0 for $\frac{Shop}{Top}$ tendon end: 6) Total Grease Loss from Data Sheet 6.0 for $\frac{Field}{Gallery}$ tendon end: 7) Estimated grease losses from leaks for $\frac{Shop}{Top}$ tendon end: 8) Estimated grease losses from leaks for $\frac{Field}{Gallery}$ tendon end: 9) TOTAL Tendon Grease Loss: 9 POURING AND HAND PUMPING - FIRST END | DATED: <u>5,5 gal.</u> <u>6 gal.</u> <u>0 gal.</u> <u>0 gal.</u> | WRL10-27-1 WRL10-27-1 |
| 5) Total Grease Loss from Data Sheet 6.0 for $\frac{shop}{Top}$ tendon end: 8) Total Grease Loss from Data Sheet 6.0 for $\frac{Field}{Gallery}$ tendon end: 7) Estimated grease losses from leaks for $\frac{Shop}{Top}$ tendon end: 8) Estimated grease losses from leaks for $\frac{Field}{Gallery}$ tendon end: 9) TOTAL Tendon Grease Loss: 9 POURING AND HAND PUMPING - FIRST END | 6 gal. O gal. O gal. | WRRID-27- |
| 7) Estimated grease losses from leaks for <u>Shop/Top</u> tendon end: 8) Estimated grease losses from leaks for <u>Field/Gallery</u> lendon end: 9) TOTAL Tendon Grease Loss: <u>0 POURING AND HAND PUMPING - FIRST END</u> | O gal. | |
| 8) Estimated grease losses from leaks for <u>Fed_/Gallecy</u> tendon end: 9) TOTAL Tendon Grease Loss: <u>0 POURING AND HAND PUMPING - FIRST END</u> | Ø gel. | WRL 10.77-1 |
| 9) TOTAL Tendon Grease Loss: <u>0 POURING AND HAND PUMPING - FIRST END</u> | | ••• |
| 9) TOTAL Tendon Grease Loss: <u>0 POURING AND HAND PUMPING - FIRST END</u> | 11.5 gal. | WERID-ZT-1 |
| | | WKR 10-27-1 |
| | | 1 |
| .7) Grease Temp.: 200 °F Thermometer ID: PK 10Z Recal Date (13.9) Initial Grease Height (a) 12,5 in. (13.12) Flual Grease Height (l (14) Total amount of Grease added: 12,39 gal. (a - b) × 1.77 Into th .16) Quantity of Waste Grease: 0 gal. (13.15) Application Applied .17) Total Grease Replaced this end: 12,39 gal. (13.15) Applied 0 HAND PUMPING - SECOND END Applied Applied Applied | | WR&10-27-0 |
| 6) Amblent Temp.: °F Thermometer ID: Recal Date 7) Grease Temp.: °F Thermometer ID: Recal Date (13.9) Initial Grease Height (a) In. (13.12) Final Grease Height (b 14) Total amount of Grease added: gal. (a - b) x 1.77 into th 16) Quantity of Waste Grease: gal. (13.15) Poured | e:in. | |
| 17) Total Grease Replaced this end: gal. | e marine de la companya de la companya | WRE P.27-1 |
| Total Tondan Panland (14 1) Total Tondan Loss (8 0) | ues. för the Tendon Not Duct Volume = <u>.68</u> % Difference 1/24 Date: /0-27-7 | WRR 10-27-11 WRR 10-27-11 WRR 10-27-10 WRR 10-27-10 |

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| GREASE | DEEDURE SQ 6.0 E CAP REMOVAL Data Sheet 6.0 July 31, 2009 Paget of 1 Revision 0 |
|---|--|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | <u></u> |
| (7.2) Tendon No.: V-1/9 Tendon End: <u>Top</u> 🖄 Shop | Field |
| Grease Cap Removal | |
| (7.5)Date Removal Started: $1D-25-ZD1D$ (7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes(7.7) Temp. of Concrete: 59 °FAmblent Temp.: 65 °FThermometer No.: $9K-8Z$ Re-Cal Date: $2-9-11$ (8.4) Anchorhead I.D.: $817/1097$ Anchorhead Verificalion: X Match | Q.C. Signoff <u>URP 1075-18</u> <u>WRC 10-25-11</u> |
| (8.5) Grease Coating Grease Cap + Complete Partial Uncoated % Buttonheads - Complete Partial Uncoated % Anchorhead - Complete Partial Uncoated % Shims - Complete V Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete V Partial Uncoated % (¹⁾ - Limited within the inside diameter of the grease cap. Bearing Plate - ⁽¹⁾ Complete V Partial Uncoated % (a) Unusual Conditions: MONC MONC MONC MONC MONC | <u>NER 10:25-11</u> |
| | WRR 10-25-12 |
| (8.7) Groase Color Match: Pres INO Grease Color: <u>Med. 13 rown</u> Comments: <u>Nowe</u> | WRR 10-25-10 |
| (8.8) Quantily of Samples O Quart Samples Identified per Step 8.8.1? Yes NA NO Location of A.H. B.P. Shims Cap Duct Removal Note: No samples taken per. TMI ensincering. | WRR 10-25-12 |
| (8.9) Qly. of Grease lost during removal of cap: O gal. (8.9.1) Grease from cap to be reused? ☑ Yes (9.6) Qly. of Grease removed from anchorage: 1.5 (9.7) Damage during cap removal or anchorage cleaning? ☑ Yes | WRR 10-25-10 WRR 10-25-10 WRR 10-28-10 WRR 10-28-10 |
| (10.3) Method of Tendon Protection: Reinsfulled the grease cape/ A www gasket | W. O. R. D. 25-10 W. R. D. 25-11 |
| (10.4) Amount of Grease Loss from Tendon duct: | V 4 |

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| | ROCEDURE SQ 6.0 SE CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|---|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| 7.2) Tendon No.: 1-119 Tendon End: Bottom DShop | Field |
| Grease Cap Removal | |
| 7.5)Date Removal Started: 10-26-10 | Q.C. Signoff |
| 7.6) Dry Ica Used on Grease Cap and/or Anchorage | |
| 7.7) Temp. of Concrete: 86 °F Thermometer No.: 57-78 Re-Cal Date: 6-23-11 | 1 1 1 |
| Ambient Temp.: 80 °F Thermometer No.: 06-103 Re-Cal Date: 6-23-11 | 760-10-26-10 |
| 8:4) Anchorhead I.D. 885 Anchorhead Verification: R Match 🗌 No-Match | 748-10-26-10 |
| · · · · · · · · · · · · · · · · · · · | |
| 8.5) Grease Coaling | |
| Grease Cap - Complete V Partial Uncoated % | |
| Buttonheads - Complete V Panlal Uncoated % | |
| Anchorhead - Complete / Partial Uncoated % | |
| Shims - Complete Partial Uncoated % | Jest 10-26-10 |
| Bearing Plate - (!) Complete / Partial Uncoated % | 110-0-00-10 |
| 6) Unusual Conditions: NONC | i i |
| | 14010-26-10 |
| 8.7) Grease Color Match: Pres INo Grease Color: <u>Brown</u> Comments: None | - 100/0-26-10 - 11210-26-10 |
| Comments: None | |
| Comments: None | |
| Comments: None 8.8) Quantity of Samples O Quart Samples Identified per Step 8.8.1? Yes MA- No | |
| Comments: None B.8) Quantity of Samples O Quart Samples Identified per Step 8.8.1? Yes MA INO Location of A.H. B.P. Shims Cap Duct Removel NOTE: No Samples Taken Per. TMIL Engineering - | <u>J.B.10-26</u> 11 |
| Comments: None B.8) Quantity of Samples O Quart Samples Identified per Step 8.8.1? Yes YA No Location of A.H. B.P. Shims Cap Duct Removal NOTE: No Samples Taken Per. TML Engissering - 8.9) Qty. of Grease lost during removal of cap: O gal. | <u>1.15.10-26-10</u> 716.10-26-10 |
| Comments: None 8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes YA- ONO Location of Removal A.H. B.P. Shims Cap Duct 8.9) Qty. of Grease lost during removal of cap: Quart Samples Quart Samples 8.9) Qty. of Grease from cap to be reused? E.Yes No Qty. of Grease removed from cap: Samples | J. B. 10-26-10 745-10-26-10 1. Jef 10-26-10 |
| Comments: None 3.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes YA- ONO B.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes Yes YA- ONO B.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes Yes Yes B.9 Quart B.P. Shims Cap Duct B.9 Qty. of Grease lost during removal of cap: O gal. B.9.1) Grease from cap to be reused? A.Yes No Qty. of Grease removed from cap: 5 gal. 9.6) Qty. of Grease removed from anchorage: 5 gal. 9 gal. | 1.65.10-26-10 11. 108.10-26-10 11. 108.10-26-10 7.03.10-26-10 |
| Comments: None 8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes YA- No Location of Removel A.H. B.P. Shims Cap Duct 8.9) Qty. of Grease lost during removal of cap: O gal. 9.9) Qty. of Grease lost during removal of cap: O gal. 9.9) Qty. of Grease removed from cap to be reused? A.Yes No Qty. of Grease removed from cap: 5 gal. 9.6) Qty. of Grease removed from anchorage: 5 gal. 9.6 Yes Yes Yes Yes Yes 9.7) Damage during cap removal or anchorage cleaning? Yes Yes Yes Yes Yes Yes Yes | 1. 1. 1. 10-26-10 11. 103.10-26-10 1. 103.10-26-10 1. 103. 10-26-10 1. 103. 10-26-10 |
| Comments: None 8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes MA INO Location of A.H. B.P. Shims Cap Duct Removal NOTE: No Samples Taken ler. TML Engistering - 8.9) Qty. of Grease lost during removal of cap: 9.9) Qty. of Grease from cap to be reused? Area INO 9.6) Qty. of Grease removed from anchorage: 5 gal. 9.7) Damage during cap removal or anchorage cleaning? Yes ANO Describe: MA 10.3) Method of Tendon Protection: Install can with new gasket. | 1. 1. 1. 10-26-10 11. 103. 10-26-10 1. 103. 10-26-10 1. 103. 10-26-10 1. 103. 10-26-10 1. 103. 10-26-10 1. 103. 10-26-10 |
| Comments: None B.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes MA ONO Location of A.H. B.P. Shims Cap Duct Removal NOTE: No Samples Taken Per. TML Engineering - 8.9) Qty. of Grease lost during removal of cap: 9.9.1) Grease from cap to be reused? Ares No Qty. of Grease removed from cap: 5 gal. 9.6) Qty. of Grease removed from anchorage: 5 gal. 9.7) Damage during cap removal or anchorage cleaning? Yes PNO Describe: 4 10.3) Method of Tendon Protection: Install can with New Qusket. | 1.63.10-26.10 11. 163.10-26.10 1.03.10-26-10 7.03.10-26-10 7.03.10-26-10 1.03.10-26-10 1.03.10-26-10 |
| Comments: $None$ 8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes YA- \square No Location of Removel \square A.H. \square B.P. \square Shims \square Cap \square Duct 8.9) Qty. of Grease lost during removal of cap: \bigcirc gal. \bigcirc gal. \bigcirc gal. 8.9) Qty. of Grease lost during removal of cap: \bigcirc gal. \bigcirc gal. \bigcirc gal. 8.9.1) Grease from cap to be reused? \blacksquare Yes \square No \bigcirc Quart \bigcirc gal. 9.6) Qty. of Grease removed from anchorage: \bigcirc gal. \bigcirc gal. \bigcirc \square A.H. 9.7) Damage during cap removal or anchorage cleaning? \square Yes \square No \square Describe: \square A.H. 10.3) Method of Tendon Protection: \square A.H. \square A.H. \square A.H. \square A.H. \square A.H. 10.4) Amount of Grease Loss from Tendon duct: \bigcirc gal. \bigcirc gal. \square A.H. \square A.H. 10.5) Total quantity of lost grease (below): \square \square A.H. \square A.H. \square A.H. | 1. 1. 1. 10-26-10 1. 1. 1. 10 10-26-10 1. 1. 1. 10 10-26-10 1. 1. 10-26-10 1. 10-26-10 1. 10-26-10 1. 10-26-10 1. 10-26-10 |
| Comments: $Mone$ 8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes YA No Location of $\Box A.H.$ $\Box B.P.$ $\Box Shims$ $\Box Cap$ $\Box Duct$ Removel $MOTE$: No Samples Taken Per: TMIL Engistering. $\Box a.H.$ 8.9) Qty. of Grease lost during removal of cap: $Ogal.$ $Qgal.$ $Qgal.$ 8.9) Qty. of Grease lost during removal of cap: $Qgal.$ $Qgal.$ $Qgal.$ 8.9.1) Grease from cap to be reused? \Box Yes \Box No $Qiy.$ of Grease removed from cap: $5gal.$ 9.6) Qty. of Grease removed from anchorage: $5gal.$ $gal.$ $9from anchorage cleaning? Yes Yes 9.7) Damage during cap removal or anchorage cleaning? Yes Yes No Describe: YA 10.3) Method of Tendon Protection: In Mahl can with new gasket. In Mahl can with new gasket. In Mahl can with new gasket. 10.4) Amount of Grease Loss from Tendon duct: gal. gal. In form form form form form form form form$ | 1.65.10-26-10 1.65.10-26-10 1.63.10-26-10 1.03.10-26-00 1.03.10-26-10 1.03.10-26-10 1.03.10-26-10 |
| Comments: $M_{ON} e$ 8.8) Quantity of Samples Quart Samples Identified per Step 8.8.1? Yes YA- \square No Location of Removel \square A.H. \square B.P. \square Shims \square Cap \square Duct 8.9) Qty. of Grease lost during removal of cap: \bigcirc gal. \bigcirc gal. \bigcirc gal. 8.9.1) Grease from cap to be reused? \blacksquare Yes \square No \bigcirc gal. 9.6) Qty. of Grease removed from anchorage: \bigcirc gal. \bigcirc gal. 9.7) Damage during cap removal or anchorage cleaning? \square Yes \square No 10.3) Method of Tendon Protection: \square $N_{Ta} III can with new gasket. (10.4) Amount of Grease Loss from Tendon duct: \bigcirc gal. (10.5) Total quantity of lost grease (below): \square $ | 1.63.10-2610 10.1026-10 10.1026-10 10.10-26-10 10.10-26-10 10.10-26-10 10.10-26-10 10.10-26-10 |

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| PSC PROCEDURE SQ 6.1 |
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| INSPECT FOR WATER |
| Data Sheet 6.1 |
| July 31, 2009 |
| Page 1 of 1 |
| Revision 0 |
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| •••••••••••••••••••••••••••••••••••••• | Tendon End: | Top | Shop | Field | |
|---|---|---|---|--|--|
| | | | | | 1 |
| ption: Doservable Mo | Quantity: 0 | | | | A\/A [2 |
| ected: 🗌 Yes 🛛 No ption: 🔲 Observable Mo | ************************************** | | | 4 | <u>a</u> n/a |
| ected: Yes XINo ption: Observable Mo | Quantity: 🔊 | Significant Moisture | Not Ar | oplicable | 3 N/A |
| octed: | Quantity: | Sample Tak | en: 🔲 Yes | □ No □ |] N/A |
| V | o Individual Name | | C |)ate: | |
| adequately identified: | i inte | •••••••••••••••••••••••••••••••••••••• | | | |
| | ption: Observable Monants: ASE CAP acted: Yes ASE CAP acted: Yes Observable Monants: NDON ANCHORAGE COM acted: Yes NDON ANCHORAGE COM acted: Yes Yes No ption: Observable Monants: NOON ANCHORAGE COM acted: Yes ENSIONING N/A acted: Yes No ption: Observable Monants: No Observable Monants: N A Notified: Yes No ATION AND STORAGE | ption: Observable Moisture nents: No ASE CAP acted: Yes acted: Yes Observable Moisture nents: NDON ANCHORAGE COMPONENTS acted: Yes Yes NDON ANCHORAGE COMPONENTS acted: Yes State Observable Moisture acted: Yes State No Quantity: Observable Moisture Provide Components No No Quantity: Observable Moisture Provide Components No No No No Quantity: Observable Moisture Provide Components No < | ption: Observable Moisture Intervation of the second of the | ption: Observable Moisture Significant Moisture Ase cAP acted: Yes Doservable Moisture Significant Moisture Yes ption: Observable Moisture Significant Moisture Not A nents: No.xe NOON ANCHORAGE COMPONENTS bacted: Yes NDON ANCHORAGE COMPONENTS bacted: Yes NDON ANCHORAGE COMPONENTS bacted: Yes NOON ANCHORAGE COMPONENTS bacted: Yes NOON ANCHORAGE COMPONENTS bacted: Yes NOARC Bostorvable Moisture Significant Moisture Yes ption: Observable Moisture Significant Moisture Prove Significant Moisture Particular Yes Not Ar noted: Yes Not Ar Notified: Yes No Individual Name: Categorie ATION AND STORAGE | ption: □ Observable Moisture: □ Significant Moisture ☑ Not Applicable nents: |

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| RSG | PSC PROCEDURE SQ 6.1 INSPECT FOR WATER Data Sheet 6.1 July 31, 2009 Page 1 of 1 Revision 0 |
|---|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (8.1) Tendon No.: <u>()-//9</u> Tend | don End: Bottom Shop Field |
| Moisture Description: Doservable Moisture Comments: NOAQ | /: O Sample Taken: Yes No SIN/A |
| (9.6.1) INSIDE GREASE CAP Water Detected: Yes SNo Quantity Moisture Description: Observable Moisture Comments: NOAC | Sample Taken: Yes No XN/A |
| (9.7.1) AROUND TENDON ANCHORAGE COMPONENT Water Detected: Yes SNo Quantity Moisture Description: Observable Moisture Comments: Non C | rs /:Sample Taken: Yes No &\/A Significant Moisture & NoTApplicable |
| (9.9.1) DURING DETENSIONING Water Detected: Yes INO Quantity Moisture Description: Observable Moisture Comments: | NIA |
| (11.1) NOTIFICATION Exelon Notified: | idual Name: Date: |
| SAMPLE IDENTIFICATION AND STORAGE (12:2) Samples adequately identified: Yes ((12:3) Samples stored at: |]NO MA |
| QC Signoff: Time C. Site QC Reviewed: W. Vanue Colle | Level: <u>17</u> Date: <u>10-26-70</u> Level: <u>17</u> Date: <u>10-27-10</u> |

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ASME IWL (Class CC) Containment Tendon Anchorage **Detailed Visual or VT-1 Visual Examination NDE Report** Page 1 of 1 Station: TMI Unit: Date: 10-25-2010 Report No: R2139507 V-119 WO No(s).: Tendon Anchorage No.: Tendon End: 🔀 Shop 🔄 Field (Junnel) Gallery, Buttress: Bearing Plate I.D.: Much Location: Elevation: Bearing Plate I.D Anchor Head I.D. Bushing I.D. 109 817 Exam Type: DV XVT-1 Type Of Exam: X Direct Remote X As Found Exam As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned Visual Aids: NONC Design Drawing(s) TMT 1-0016 M&TE Used Stal Scale R-21 CA Test Card UTC or Serial No. Cal. Due Date: NL Illumination Used Flisht Illumination Verified: Date: 10-25-2010 Time: 0730 Special / Specific Instructions: Component / Item Number and RESULTS **Explanation / Notes** Description **RI TYPE** (Sketch Shall Be Attached Depicting Location Of All NI IÔ Missing, Protruding, Unseated Wires) Tendon Anchorase Inactive corrosion on surface of bushing. No pitting. F components for V-119 shop/Top End Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: Α. **Missing Wires** H Cracks 0. Other (Explain) Missing Button Heads Β. Pitting 1 Protruding / Unseated Wires C. 1 Nicks, Gouges, Mechanical Damage D. Broken Wires Κ. Uneven Shim Stack Active Corrosion **Excessive Shim Gaps** E. 1 F Other Corrosion Μ. Gasket Seating Surface Damage Evidence Of Free Water (Quantify) Surface Discontinuities, Deflections G. N Supplemental Information : XYes No Sketch Photo Video Other (Describe) Results: Acceptable ZYes. **No** EXAMINER/EVALUATOR T DATE 10.25-2010 (Print & Sign) W. RAHEE Robbins LEVEL STATION/ADMIN REVIEW DATE 10/29/2010 (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes □ No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RI REVIEW (as applicable) DATE: DATE: 11-6-10 ANII REVIEW (as applicable)

ATTACHMENT 5

Page ____ of ____

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| Station: TALE Unit: 1 Date: 10-26-70 Report No: #4 WON No(s): A 2139507 Tendon Anchorage No: [V-1/9] Tendon End: Shop Estiliad Location: Tunnel (Galler) Buttress: Elevation Bearing Plate ID: Juncht #4 Bearing Plate ID Machor Head ID. #85 Bushing ID. ## Bearing Plate ID Machor Head ID. #85 Bushing ID. ## Bearing Plate ID Machor Head ID. #85 Bushing ID. ## Bearing Plate ID Machor Head ID. #85 Bushing ID. ## Bearing Plate ID Machor Head ID. #85 Bushing ID. ## Bearing Plate ID Machor Head ID. #85 Bushing ID. ## Bearing Plate ID Machor Head ID. #Seciel Instructions: Cal Due Date: # Machor Head ID Bearing Plate ID Machor Head ID. # F Explanation / Notes Special / Specific Instructords: # H Illumination Verified: Date: /e24-/20 Time: Size Am Component / Item Number and Descript | | 1 490 | | | |
|---|---|---------------------------------------|--|--|-----------------|
| Location Tunnel Galley Buttress Elevation Bearing Plate 1.D. Location Examp Plate 1.D. //// Anchor Head 1.D. 855 /// Bushing 1.D. //// Examp Type DV SVT-1 Anchor Head 1.D. 855 /// Bushing 1.D. //// Examp Type DV SVT-1 Anchor Head 1.D. 855 /// Bushing 1.D. //// Examp Type DV SVT-1 Anchor Head 1.D. 855 /// Bushing 1.D. //// Examp Type DV SVT-1 Anchor Head 1.D. 855 /// Bushing 1.D. //// Examp Conduct State Anchor Head 1.D. Visual Aids /// Anchorse Cal Due Detertioned Mater Used field Location I Anchor Head 1.D. State Sta | Station: TMI Unit: 1 | Date: | 0-26-10 | Report No: MA | |
| Location Tunnel. Galler) Buttress: Elevation Torking Bearing Plate 1.D Unceller to Locate 1.D Bearing Plate 1.0 YA Anchor Head 1.D ### Bearing Plate 1.D YA Exam Type OF Exam DV EVT-1 Type OF Exam Elevation Elevation Elevation Bearing Plate 1.D YA Exam Type OF Exam DV EVT-1 Type OF Exam Elevation Elevation< | WO NO(S): 19 2139507 | Tendon Anct | | | |
| Bearing Plate I.D. 1/24 Anchor Head I.D. 885 / Bushing I.D. 1/24 Exam Type: DV 2471-1 Type Of Exam GDirect □Remote Mare Used 5/261 (2002 (502 Card) UTC or Serial No. 1/24 Card Due Date 1/226 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/22 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/22 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/22 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card UTC or Serial No. 1/24 Card Date 1/24 (2002 Card) Card) Card Card Date 1/24 (2002 Card) Card Card | | · · · · · · · · · · · · · · · · · · · | Elevation: 79 | Bearing Plate I.D. 4 | |
| Exam Type: □ V Ø7T-1 Type Of Exam Direct □ Remote Ø As Found Exam □ As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned Design Drawing(s) Tat 3-00L Visual Ads. Note: Note: Cal. Due Date: Note: MATE Used to the the the the the the the the the the | | | 98C | Bushing ID N/4 | LOLATE. |
| ▲ As Found Exam □ As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned Design Drawing(S) Thi 1 - 001/L Visual Ads: Mone Was TE Used State (Met Coll State) Prest Card UTC or Serial No. M/L Cal. Due Date: M/L Illumination Used [Ask] (Latter State) Illumination Verified: Date: /0-26-//O Time: £1:00 Am Specific Instructions: M/L RESULTS Explanation / Notes Component / Item Number and Description RESULTS Explanation / Notes An charage Component's for U-119 Bottom / KielQ - A / previous // missing. Protrucing. Unseated Wires) An insing Wires A / previous // missing wire - Sce. Enclosure 6, Nat Skeet Y. A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Prind O. Other (Explain C. Protruding Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Excessive Shim Gaps O. Other (Explain C. Protruding Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Prindg O. Other (Explain O. Other (Explain C. Protruding Unseated Wires J. Nic | | | | | ote |
| Design Drawing(s) Tht 1.00/ Visual Aids: None M&TE Used 24 clight for the carbonic of the car | | As Left Exam Follo | | | |
| MATE Used 3/kl (AvE KV2 KV2 KV2 KV2 KV2 KV2 KV2 KV2 KV2 KV2 | | | | of relidens which have been | Detentioned |
| Illumination Used F(ask) is tool Illumination Verified: Date: 10-26-10 Time: \$item Am Special / Specific Instructions: MA Component / Item Number and Description RESULTS Explanation / Notes An charage Component's A / previously missing Wire. for: U-119 Bottom / Field - F Light rust on anchor head and Shims s, F Light rust on anchor head Results Legend: NI - No Indications RI - Recordable Indication Tope Codes: O. Other (Explain A Missing Wires H. Cracks O. Other (Explain B Missing Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain C Protorosion K. Uneven Shim Stack E. Exclosure Damage O. Other (Explain C Protorosion L. Excessive Shim Gaps Surface Damage O. Other (Explain Supplemental Information Drytes No Surface Discontinuities, Deflections Surface Damage D Broken Wires J. Nicks, Gouges, Mechanical Damage Surface Discontinuities, Deflections Supplemental Information Drytes No Surface Discontinuities, Deflections Surface Discontinuities, Deflections | | | | Cal Due Date: | vn |
| Special / Specific Instructions: VML Component / Item Number and Description RESULTS Explanation / Notes NI RI TYPE IO (Sketch Shall Be Attached Depicting Location Of All Missing, Protructing, Unseated Wires) An chorage Component's for U-119 A / previously missing wire. for U-119 Bottom / Frield - F Light rust on anchor head and shims, Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: | | | | | |
| Component / Item Number and Description RESULTS Explanation / Notes NI RI TYPE IO (Sketch Shall Be Attached Depicting Location Of All Missing, Protructing, Unseated Wires) An charage Components A / previously missing, Protructing, Unseated Wires) An charage Components A / previously missing, Protructing, Unseated Wires) For U-119 Bottom/Field F Light rust on anchor head and Shims r. F Light rust on anchor head Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - Recordable Indication IV - Recordable Indication <t< td=""><td></td><td></td><td></td><td></td><td>8 W FAL</td></t<> | | | | | 8 W FAL |
| Description NI RI TYPE IO (Sketch Shall Be Attached Depicting Location Of All Missing, Protruding, Unseated Wires) An charage Components A / previously missing wire - see Enclosure 6, DataSheet 9. For U-119 Bottom/Frield - F Light rust on anchor head and shims, Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Results Legend: NI - No Indications RI - Recordable Indication ID - Information Only Results Legend: NI - No Indications RI - Recordable Indication ID - Information Only Results Legend: NI - Recordable Indication Type Codes: O. Other (Explain R. Missing Button Heads I. Pitting O. Other (Explain B. Missing Button Heads J. Nicks, Gouges, Mechanical Da | | RESULTS | | Explanation / Notes | |
| An chorage Components A / previously missing wire. For U-119 Bottom/Field. Sce Enclosure 6, Data Sheef Y. For U-119 Bottom/Field. F Light rust on anchor head. and Shims, F Light rust on anchor head. Results Legend: NI-No Indications RI-Recordable Indication 10 - Information Only Results Legend: NI-No Indications RI-Recordable Indication 10 - Information Only Results Legend: NI-No Indications RI-Recordable Indication Type Codes: A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain G. Borden Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion L. Excessive Shim Stack Date (Describe): Results: Acceptable Proto Video Other (Describe): Supplemental Information Yes INO State Discontinuiti | | | Sketch S | - | cation Of All |
| An chorage Components A / previously missing wire - for U-119 Bottom/Frield - Sce Enclosure 6, DataSheet 9. F Light rust on anchor head and Shims, F Results Legend: NI - No Indications NI - No Indications RI - Recordable Indication NI - No Indications RI - Recordable Indication Results Legend: NI - No Indications RI - Recordable Indication To - Information Only Recordable Indication Type Codes: O. A. Missing Button Heads I. Pitting C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information: Yes INO Results: Acceptable Pres INO Results: Acceptable Pres INO Station Corrosion Level DATE I. Examiner/Evaluator notes RI or Unacceptable condition. Results Acceptable Resuits: Acceptable Yes | | | | | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication New Shim S , O. Other (Explain A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information (Qres [No Qres Photo] Nideo [Other (Describe): Results: Acceptable Pres [No Sketch Qres [No Qres [No Qres Photo] DATE [0/20/Qolo] StatiOn/ADMIN REVIEW Event [Onsen [Pres]No DATE [0/20/Qolo] DATE [0/20/Qolo] | | <u> </u> | | | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication New Shim S , O. Other (Explain A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information (Qres [No Qres Photo] Nideo [Other (Describe): Results: Acceptable Pres [No Sketch Qres [No Qres [No Qres Photo] DATE [0/20/Qolo] StatiOn/ADMIN REVIEW Event [Onsen [Pres]No DATE [0/20/Qolo] DATE [0/20/Qolo] | Anchorage Components | | A / previous | ily missing wire - | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication New Shim S , O. Other (Explain A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information (Qres [No Qres Photo] Nideo [Other (Describe): Results: Acceptable Pres [No Sketch Qres [No Qres [No Qres Photo] DATE [0/20/Qolo] StatiOn/ADMIN REVIEW Event [Onsen [Pres]No DATE [0/20/Qolo] DATE [0/20/Qolo] | for U-119 Bottom / Kield - | | Geo Encle | movere 6. Data Sheet 4 | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: O. Other (Explain A. Missing Button Heads I. Pritting C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information: DYes No Sketch Photo Print & Sign) Results: Acceptable Dyes No STATION/ADMIN REVIEW Evan Johns DATE Jo/24/30/0 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | | | | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: O. Other (Explain A. Missing Button Heads I. Pitting C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information Mres No Sketch Photo (Print & Sign) Carter Carter DATE 10/24/26-10 STATION/ADMIN REVIEW Event DATE 10/24/26-10 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | | | 1 1 1 0 | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: O. Other (Explain A. Missing Button Heads I. Pritting C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information: DYes No Sketch Photo Print & Sign) Results: Acceptable Dyes No STATION/ADMIN REVIEW Evan Johns DATE Jo/24/30/0 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | | F Light ru | st on anchor head | |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: O. Other (Explain A. Missing Button Heads I. Pitting C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information Mres No Sketch Photo (Print & Sign) Carter Carter DATE 10/24/26-10 STATION/ADMIN REVIEW Event DATE 10/24/26-10 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | | and shine | 5, | |
| NI - No Indications RI - Recordable Indication 10 - Information Only Recordable Indication Type Codes: A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Dres INO Supplemental Information : Dres INO Sketch Photo Other (Describe): Results: Acceptable Ares INO EXAMINER/EVALUATOR DATE 10/24/26/D Veriat & Sign) Even Johns DATE 10/24/26/D DATE 10/24/26/D This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | | | | |
| NI - No Indications RI - Recordable Indication 10 - Information Only Recordable Indication Type Codes: A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protrucing / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Dyes INO Supplemental Information : Dyes No Sketch Photo Other (Describe): Results: Acceptable Ares Intervention DATE 10/24/26/0 Verint & Sign) Event Only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable is No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | <u> </u> | | | |
| Recordable Indication Type Codes: A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain E. Active Corrosion L. Excessive Shim Gaps E. Active Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information: Pres No Sketch Prioto Other (Describe): Results: Acceptable Pres No EXAMINER/EVALUATOR DATE 10-26-10 (Print & Sign) DATE 10/2@/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | ications RL Para | rdable Indication IO | Information Only | ı |
| A. Missing Wires H. Cracks O. Other (Explain B. Missing Button Heads I. Pitting O. Other (Explain C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage O. Other (Explain D. Broken Wires J. Nicks, Gouges, Mechanical Damage Damage D. D. Broken Wires K. Uneven Shim Stack Excessive Shim Gaps Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage Surface Discontinuities, Deflections Supplemental Information : Qres No Sketch Qres No Results: Acceptable Yes No DATE 10-26-10 STATION/ADMIN REVIEW Event Onts DATE 10/2.4/2010 DATE 10/2. | | | | | <u></u> |
| B. Missing Button Heads I. Pitting C. Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Pres No Sketch Photo Christian Sign) Image LEVEL DATE 10/26-10 Station to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | A. Missing Wires | | | 0. 0 | Other (Explain) |
| D. Broken Wires K. Uneven Shim Stack E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Pres No Sketch Photo Other (Describe): Results: Acceptable Vers No EXAMINER/EVALUATOR (Print & Sign) C. C. DATE 10/24/2010 Station to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | 1. | | | |
| E. Active Corrosion L. Excessive Shim Gaps F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Yes No Sketch Photo Other (Describe): Results: Acceptable Yes No EXAMINER/EVALUATOR Image: Colspan="2">Acceptable (Print & Sign) LEVEL DATE 10-26-10 STATION/ADMIN REVIEW Even Johnson DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | | | hanical Damage | |
| F. Other Corrosion M. Gasket Seating Surface Damage G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Yes No Sketch Photo Other (Describe): Results: Acceptable Yes No EXAMINER/EVALUATOR (Print & Sign) LEVEL DATE 10-26-10 STATION/ADMIN REVIEW (Print & Sign) Evan Johns DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | K. | | | |
| G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections Supplemental Information : Yes No Sketch Photo Other (Describe): Results: Acceptable Qrest No Sketch Photo Other (Describe): Results: Acceptable Qrest No LEVEL DATE 10-26-10 STATION/ADMIN REVIEW Even Onse DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | 1 | L. M | | | |
| Results: Acceptable Yes No EXAMINER/EVALUATOR (Print & Sign) Image: Constant Const | | | | | |
| Results: Acceptable Yes No EXAMINER/EVALUATOR Imm | | | | ويرجلي ومنهور منبي مندور ومتعادي والمعار فيتعار ومعالية والتقوية للتورية الموالي والتروي التكريب التكريب التركيب التكريب | |
| (Print & Sign) //mix C_f/tors LEVEL DATE /0-26-/0 STATION/ADMIN REVIEW Evan Johnson DATE 10/29/2010 (Print & Sign) Evan Johnson DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | | Results: Accepta | ble Yes | No | 1 |
| STATION/ADMIN REVIEW Even Johnson DATE 10/29/2010 (Print & Sign) DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) No | EXAMINER/EVALUATOR | Ardi | | ~ | |
| STATION/ADMIN REVIEW Even Johnson DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | (Print & Sign) | KI C-EITOS | L | EVEL T DATE | 10-26-10 |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | STATION/ADMIN REVIEW | 1 (74 | | | |
| RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | | \sim \sim | DAIL 190 | |
| Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | This section to be complet | ed only if Exami | ner/Evaluator not | es RI or Unacceptable cor | ndition. |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | RI or Unacceptable results Accept | able 🗌 Yes 🛛 | No | | |
| | Additional Actions: | | | | |
| LEVEL III or RI REVIEW (as appligable) DATE: | (Action Request, Work Order, Issue Report, etc. | : initiated for Corrective | Action) | | |
| | LEVEL III or RI REVIEW (as applicab | le) | | DATE: | |
| ANII REVIEW (as applicable) becert lithilly DATE: 11-4-10 | 17 | ent lither | in the second se | | 1 |
| | 7 | Page | of I | | |

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| | ATTACHMENT | - | |
|---|---|--|------|
| ASME IWE (Class CC) Containme | ent Concrete VT-1 | IC or VT-3C Visual Examination NDE | |
| | Report | | |
| · | Page 1 of 1 | | |
| Station: TMI Unit: 1 | Date: 10 - 2 | 5-2010 Report No: | |
| System: Tendon S Component: 2 4/64 of | fooncrete + 100000 | LV-119 WO No(s): R2139507 | |
| Location: Building: Carninger + Elev | Col.: | N/A Row: N/A Azimuth/Radius: N/ | 4 |
| | T-3C Type Of Exar | | +< |
| Design Drawing(s) TMI 1-0016 | Visual Aids: / | None | |
| Surface: ID (OD) | Surface / Cor | nponents Coated: 🗌 YES 🛛 🔀 NO | |
| M&TE Used: Nor Test C | Card UTC or Seria | INO. N/C Cal. Due Date: N/A | |
| Illumination Used Flash lisht | Illuminati | on Verified: Date: 10-25-20/OTime: 073 | 30 |
| Special / Specific Instructions: | | | |
| Component / Item Number and | RESULTS | Explanation / Notes | |
| Description | NI RI TYPE 10 | (As a minimum, Record Location and Size of | |
| (e.g. EIN, EID, etc.) | | Recordable Indications as applicable) | |
| 2' Area of concrete around | | | |
| V-119 Fendon, shop/topend | | No visable indications | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | Results Lege | nd: | |
| NI - No Indication | ns RI - Recordable In | dication IO – Information Only | |
| | Recordable Indication | | |
| A. Cracks (Characterize and Size) G. B. Exposed Reinforcing Steel H. | Settlements Or Deflection Degraded Patches or Re | ······································ | |
| C. Exposed Metallic Items (Other) | Popouts , Voids, Honey | | |
| D. Evidence Of Grease Leakage J. | Spalls | P. Air Voids / Bug Holes | |
| E. Evidence Of Moisture K. | Cold Joint Lines | Q. Efflorescence | |
| F. Leaching Or Chemical Attack L. | Corrosion Staining | R. Other (Explain) | |
| Supplemental Information : Yes No | Sketch Photo | | |
| | esults: Acceptable | Yes No | |
| (Print & Sign) W. Ruke Robbins W. Rom | ce tole - | LEVEL T DATE NZS-2 | 2010 |
| (Print & Sign) | Tohnon m | DATE 10/29/2010 | _ |
| | nly if Examiner/Eva | luator notes RI or Unacceptable condition. | |
| RI or Unacceptable results Acceptable | Yes No | - | |
| Additional Actions: | | | |
| (Action Request, Work Order, Issue Report, etc. initiate | ed for Corrective Action) | · | |
| LEVEL III or RE REVIEW (as applicable) | | DATE: | |
| ANII REVIEW (as applicable) | h & Shuty | DATE: 11- 4-10 | |
| \mathcal{F} | | | |

Page ____ of ____

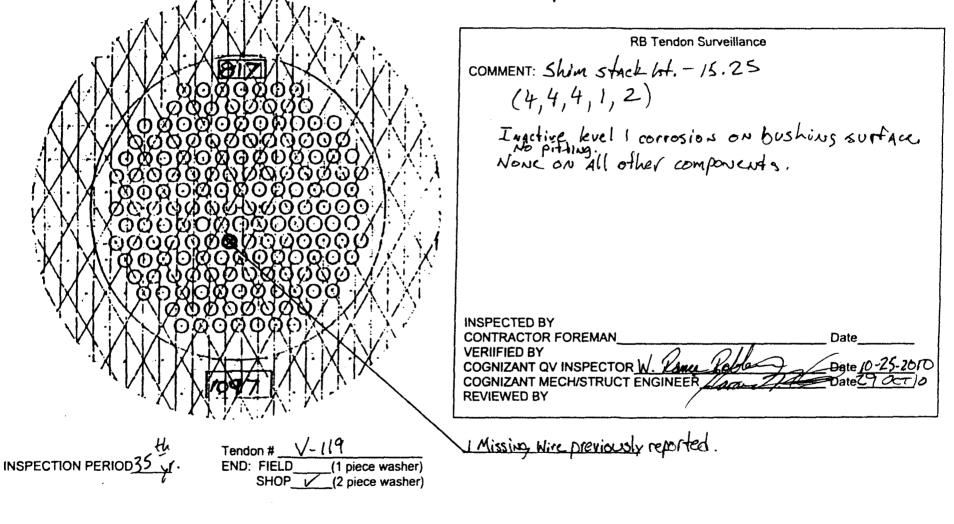
ER-AA-335-018

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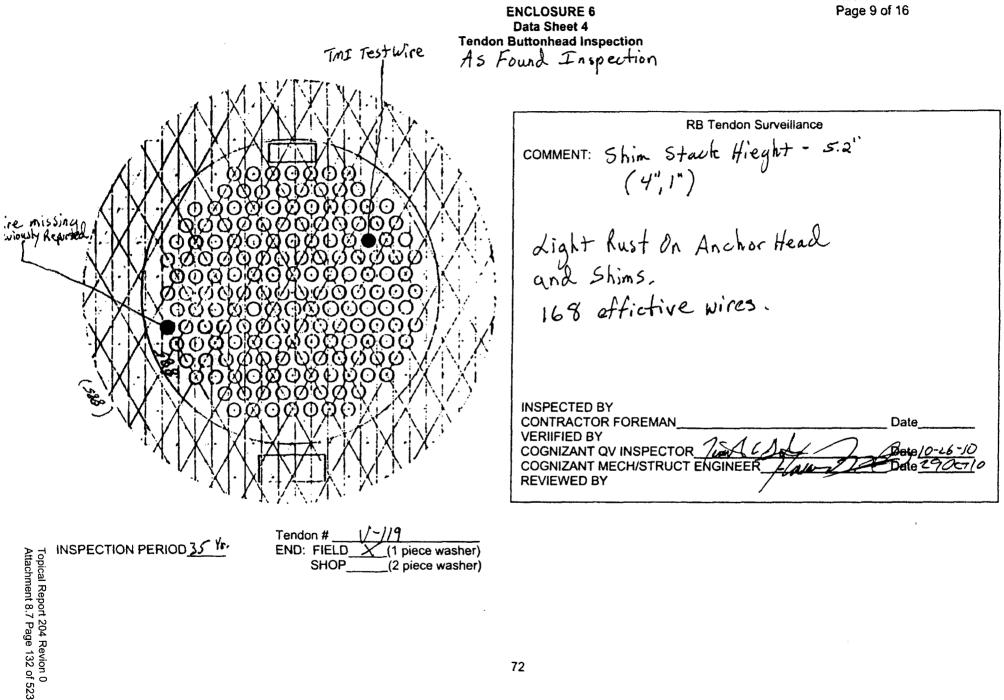
| | Repo Page 1 | | | |
|---|-------------------------------------|--------------------------------------|--|--------------------|
| Station: TMI Unit: 1 | Date: | 0-26-10 | Report No | M/A |
| System Tendons Component: Conce | to 24" 0 | having alla | WO No(s). | R 2139507 |
| Location: Building: Containment Elev | , Tendon | Col. MA F | | muth/Radius |
| | | Df Exam: MDirect | | latl. Type: Concre |
| Exam Type: DV DV DV VT-1C V Design Drawing(s) TA1-0016 | | Aids: None | | Idii. Type. Concre |
| Surface: ID (OD) | | e / Components C | Coated: YES | PT NO |
| M&TE Used stoel Rule R. W 6-18-11 M Test | | r Serial No. M. | W States and a state of the sta | I. Due Date: |
| Illumination Used Flash light | | umination Verified | : Date: 10-26-1 | D Time: 8:00 6 |
| Special / Specific Instructions: MA | | | | |
| Component / Item Number and | RESULT | | Explanation | |
| Description (e.g. EIN, EID, etc.) | NI RI TYP | | mum, Record Locati e Indications as app | |
| Concrete area 24" around | 1 | | | |
| a la di la far teadon | | A Crack | fron corners fle out, 19 th long 2 | rearing plate to |
| Anchor Plate for tendon V-119 Bottom/Field | | Contrian | out. 19" long 2 | 010 mide |
| V-119 Bottom/Field | | 2011091 | | |
| v | | A From a | ljacent corner g 2.010 wîde | to outerwall. |
| | | D+" 10 | a a sio mide | |
| | | 12 101 | g 2.010 wine | - |
| | | | | |
| | | | | |
| NI - No Indicatio | | ults Legend: rdable Indication 10 | - Information Only | ł |
| | Recordable In | dication Type Codes: | | |
| A. Cracks (Characterize and Size) G. B. Exposed Reinforcing Steel H. | Settlements Or Degraded Patc | | M. Scaling / Dustin N. Coating Deterio | |
| C. Exposed Metallic Items (Other) I. | Popouts , Voids | | O. Abrasion, Cavil | |
| D. Evidence Of Grease Leakage J. | Spalls | | P. Air Voids / Bug | Holes |
| E. Evidence Of Moisture K. F. Leaching Or Chemical Attack L. | Cold Joint Line: Corrosion Stair | - | Q. Efflorescence R. Other (Explain | ۱ |
| Supplemental Information : Ares No | | Photo Video | Other (Describe | |
| R | esults: Acceptat | oie 🔄 🕂 es 🗌 | No | · |
| EXAMINER/EVALUATOR | CAL | | THE T | 10 |
| (Print & Sign) Jinoby C. Gibon | | | EVEL JL | DATE 10-26-10 |
| (Print & Sign) | Johnson | | DATE | 10/29/2010 |
| This section to be completed of | | ner/Evaluator not | | |
| - | - | No | | |
| RI or Unacceptable results Acceptable | hand the h | · + | | |
| RI or Unacceptable results Acceptable Additional Actions: | | | | 1 |
| Additional Actions: (Action Request, Work Order, Issue Report, etc. initia | ited for Corrective / | Action) | | |
| Additional Actions: | ited for Corrective | Action) | DATE | |

ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection

As Found Inspection



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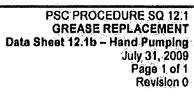


| |) | | | PSC PROCEDURE SQ 12. REPLACE GREASE CA Data Sheet 12. July 31, 200 Page 1 of Revision |
|---|--------------------------------|---------------------------|--|--|
| Project: T | MI 35 TH YEAR TENDO | DN SURVEILLANCE | te de la parte de la Anna de Anna de Anna de Anna de Cara de C | <u></u> |
| Tendon No.: | <u>Y-119</u> | Tendon End: Top | Shop | Field |
| | | ANCHORAGE INSPECTION CRI | TERIA | |
| | BEARING PLATE S | URFACE PROPERLY PREPARED: | X YES | |
| | · , , , . · | FACE PROPERLY PREPARED: | YES | |
| | GASKET MATING | SURFACE PROPERLY PREPARED | K YES | □.NO |
| | STUD/BOLT HOLE | S PROPERLY PREPARED: | 区 YES | |
| | FOREIGN MATERI | AL EXCLUSION CONTROLLED: | X YES | |
| | COMMENTS NON | ف | | |
| | | | | |
| | | | | |
| | | | | |
| | . <u></u> | . <u> </u> | 1997 1977 See Standing of Sector Sect | <u></u> |
| CREW FORE | | 6h412- | · · · · · · · · · · · · · · · · · · · | Date: <u>10-25-10</u> |
|) QC Réview | ed: Dona Cat | J.J. Level | T | Date: 10-28-70 |
| n an /del> | | | | 25 SQ 12.0 TM 09 ISI.0 |

25 SQ 12.0 TM.09 ISLOOC Topical Report 204 Revion 0 Attachment 8.7 Page 133 of 523

| RSS | | | PSC PROCEDURE SQ 12 REPLACE GREASE CA Data Sheet 12 July 31, 200 Page 1 of Revision |
|-------------|--|---|--|
| Project: T | MI 35 TH YEAR TENDON SURVEILLANCE | <u>àg, ngayan haotan na na na kata kata kata kata</u> | nyana kanang mang mang mang mang mang mang mang |
| Tendon No.: | 1/-119 Tendon End: Bottom | Shop | X Field |
| ; | ANCHORAGE INSPECTION CRITI | ERIA | |
| | BEARING PLATE SURFACE PROPERLY PREPARED: | YES | |
| | GREASE CAP SURFACE PROPERLY PREPARED: | YES | |
| | GASKET MATING SURFACE PROPERLY PREPARED: | ⊠ YES | |
| | STUD/BOLT HOLES PROPERLY PREPARED: | VES | <u>NO</u> |
| | FOREIGN MATERIAL EXCLUSION CONTROLLED: | AYES | D NO |
| D | ĊŎMMĔNŢŞ / | | |
|) | comments None | | |
|) | COMMENTS None | | |
| | COMMENTS None | | |
| | COMMENTS None | | |
| | COMMENTS None | | |
| CREWFOR | EMAN SIGNOFF Alkalway | | Date: <u>µ0-26-10</u> |

| 25 SQ 12.0 TM.09 ISI.doc | |
|--------------------------------|--|
| Topical Report 204 Revion 0 | |
| Attachment 8.7 Page 134 of 523 | |



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| Project: TMI 35 th YEAR TENDON SURVEILLANCE | Tendon No.: _V | <u>.114</u> |
|---|--|--------------------|
| GREASE REPLACEMENT | | QC SIGNOFF: |
| 8:4) Grease Used 🛛 NEW 🗋 OLD - TEST DATE: 🗌 ACCEPTABLE .0 PREREQUISITES | APPROVAL LETTER | WRR 10.26 |
| 3.5) Total Grease Loss from Data Sheet 6.0 for <u>Shop / Τορ</u> tendon end: | Z gal. | WERD-26-1 |
| 3.6) Total Grease Loss from Data Sheet 6.0 for Britan / CAllery tendon end: | gal. | WRRID-26-1 |
| 3.7) Estimated grease losses from leaks for Shap/Top tendon end: | 🔿 gal. | WRE POIL-1 |
| 3.8) Estimated grease losses from leaks for Bottom /Gallery tendon end: | O gal. | WRR 10-26-1 |
| 3.9) TOTAL Tendon Grease Loss: | B gal. | WRR. 10-26-1 |
| 3.0 POURING AND HAND PUMPING - FIRST END | | |
| 3.6) Ambient Temp :: 6/ °F Thermometer ID: pk 102 Recal Date: | | ₩ -₩ -₩ * |
| 3.7) Grease Temp.: 220. °F Thermometer ID: PKID2 Recal Date: | 2-9-11 | |
| (13.9) Initial Grease Height (a) 14.5 in. (13.12) Final Grease Height (b) | in | |
| (3.14) Total amount of Grease added: 4.425 gal. $(a-b) \times 1.77$ into the | Shop Top end | |
| 3.16) Quantity of Waste Grease: O gal. (13.15) 🕅 Poured | Hand Pumped | |
| 3.17) Total Grease Replaced this end: 4425 gal. | | NRE 1076-1 |
| 3.0 HAND PUMPING SECOND END | لمن ما بالای الله بالله بالله مارد و بالله بالله بالله و الله بالله بالله بالله بالله بالله بالله بالله بالله مستقب مستقب الله بالله |
| 3.6) Ambient Temp.: °F Thermometer ID: Recal Date: | | |
| 3.7) Grease Temp.: •F Thermometer ID: Recal Date: | | |
| (13.9) Initial Grease Height (a) (13.12) Final Grease Height (b) | in. | |
| 3.14) Total amount of Grease added: A gal. (a-b) x 1.77 into the | end | |
| 3.16) Quantity of Waete Grease: gal. (13.15) Poured | Hand Pumped | |
| 3.47) Total Grease Replaced this end: gal. | · · · · · · · · · · · · · · · · · · · | WRE 10-26-10 |
| A.O CALCULATION OF PRESSURE PUMPING | | |
| 4.1) Total <u>Tendon</u> Grease Replaced: <u>4,425 gal.</u> (13.17 + 13.17) | a car water at an even and a second | |
| 4.2) Net Tendon Duct Grease Volume: Total Tendon Replaced (14.1) - Total Tendon Loss (8.9) | | |
| 4.3) Percent Difference: Net Tendon Duct Grease Volume (14.2) × 100 = | 1.09 % Difference | WRR IS-26-TC |
| 4.4) Grease Leaks: 🖸 Yes 🖄 No | | WRR 10-26-10 |
| 4.5) Refill Acceptable: Styres (less than 10%) INO (greater than 10%) | , | WRK 107610 |
| 4.6) Comments: NONE | | WREIDZEIL |
| | ······································ | |
| Reviewed: 10ml C. Auto Level: 47 | Date: 10-27 | -10 |
| | · · · · · · · · · · · · · · · · · · · | |

| Project:TMI 35 TH YEAR TENDON SURVEILLANCEImage: Constraint of the second seco | C. Signo |
|---|--------------|
| $ \begin{array}{c} Grease Cap Removal \\ \hline Grease Cap Removal \\ \hline Grease Cap Removal \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap and/or Anchorage \\ \hline Grease Cap Removal \\$ | |
| (7.5)Date Removal Started: $10 - 19 - 10$ (7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes(7.7) Temp. of Concrete: 58 °FThermometer No.: $57 - 78$ Re-Cal Date: $6 - 23 - 1/$ Ambient Temp: 58 °FThermometer No.: $9k - 703$ Re-Cal Date: $6 - 23 - 1/$ | Q.C. Signo |
| (7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes \square Yes \square Yes \square No (7.7) Temp. of Concrete: SS °F Thermometer No.: $ST - NS$ Re-Cal Date: $6 - 2.3 - 1/$ Ambient Temp.: SS °F Thermometer No.: $PK - 2.3$ Re-Cal Date: $6 - 2.3 - 1/$ | Q.C. Signo |
| (7.6) Dry Ice Used on Grease Cap and/or Anchorage \Box Yes \frown No(7.7) Temp. of Concrete: $S8 \circ F$ Thermometer No.: $S7 - 78$ Re-Cal Date: $6 - 23 - 1/$ Amblent Temp.: $S8 \circ F$ Thermometer No.: $\rho R - 03$ Re-Cal Date: $6 - 23 - 1/$ | |
| Ambient Temp:: 58 °F, Thermometer No.: pk-yo3 Re-Cal Date: 6-23-// | |
| | |
| (8.4) Anchorhead I.D.: <u>EX 7W7/1058</u> Anchorhead Verlification: EStMatch INo-Match | JLS. 10-19-1 |
| | 1.10-19-1 |
| (8.5) Grease Coaling | <u>.</u> |
| Grease Cap - Complete Partial Uncoated % | |
| Buttonheads Complete / Partial Uncoated % | |
| Anchorhead - Complete / Partial Uncoated % | |
| Shims Complete // Partial Uncoated % | |
| and the second design of the s | 110-19-10 |
| (I) - Limited within the inside diameter of the grease cap. | |
| | 10-18-10 |
| | 1.010-19-12 |
| 8.8) Quantily of Samples 2 Quart Samples Identified per Step 8.8.1? Pres 🔲 No | ****** |
| | |
| Removal BAH. B.P. Exshims Cap Duct | 12-19-19-10 |
| 8.9) Qty. of Grease lost during removal of cap: O gal. | 113,10-19-1 |
| | \$ 10-19-10 |
| 9.6) Qly. of Grease removed from anchorage: 1,5 gal. | W. 10. A-10 |
| | 10-19-11 |
| 10.3) Method of Tendon Protection: Install Can With New Gaster ?- | LA. 10-19-1 |
| | A India |
| | M.10-19-1 |
| 10.5) Total quantity of lost grease (below): | |
| $(8.8) + (8.9) \underline{O} + (8.9.1) \underline{5} + (9.8) \underline{/.5} + (10.4) \underline{O} = \underline{7} \text{ TOTAL}$ | 10-19-10 |
| 11.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. STYRES INO | 07-10-19-10 |
| CReviewed: W. Come Roble Level: II Date: 10-2 | 28-10 |
| | |

15 SQ 60 TM 09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 136 of 523

| | CEDURE SO 6. CAP REMOVAL Data Sheet 6: July 31, 200 Page1 of Revision (|
|---|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | an a the second second second second second second second second second second second second second second seco |
| (7.2) Tendon No.: U-134 Tendon End: Bottom Shop | Field |
| Grease Cap Removal | |
| 7.5)Date Removal Started: 10-19-10 | Q.C. Signof |
| 7.8) Dry Ice Used on Grease Cap and/or Anchorage | • • • • • • • • • • • • • • • • • • • |
| 7.7) Temp. of Concrete: <u>78 °F</u> Thermometer No.: <u>ST-78</u> Re-Cal Date: <u>6-23-//</u> | |
| Ambient Temp.: 18 °F Thermometer No.: 18-103 Re-Cal Date: 6-23-1/ | 762 10-19-10 |
| 8.4) Anchorhead I.D.: FY 27 R 27 Anchorhead Verification: Anchorhead Verification: | 745 10-19-10 |
| 8.5) Grease Coating Grease Cap - Complete Partial Uncoated % Buttonheads - Complete Partial Uncoated % Anchorhead - Complete Partial Uncoated % Shims - Complete Partial Uncoated % | |
| Bearing Plate – ⁽¹⁾ Complete V Partial Uncoated <u>%</u> | 100-10-19-10 |
| 8) Unusual Conditions: | <u>7.05.10-19-15</u> |
| 8.7) Grease Color Match: 12 Yes INO Grease Color: Med. Brown Comments: None | 7.63.10-19-10 |
| 8.8) Quantily of Samples 2 Quart Samples Identified per Step 8.8.1? 🖾 res 🗌 No | an an an an an an an an an an an an an a |
| 3.8) Quantily of Samples 2 Quart Samples Identified per Step 8.8.1? Stres INo Location of A.H. B.P. Sthims Step Duct Removal | 703.10-19-10 |
| 3.9) Qty: of Grease lost during removal of cap: O gal. | 24/0-19-10 |
| 1.9.1) Grease from cap to be reused? Yes INO Qly of Grease removed from cap: .5 gal. | 763 10-19-10 |
| (6) Qty. of Grease removed from anchorage: Ø gal. | 763.10-19-16 |
| 7) Damage during cap removal or anchorage cleaning? Yes No Describe: | 710-19-10 |
| 0.3) Method of Tendon Protection: Install Can With New Gasket | 205-10-19-10 |
| 0.4) Amount of Grease Loss from Tendon duct: gal. | 7.1.10.14.10 |
| 10.5) Total quantity of lost grease (below): (8.8) $15 + (8.9)$ $0 + (8.9.1)$ $5 + (9.6)$ $0 + (10.4)$ $0 = 1$ TOTAL | 710 10-19-10 |
| 11.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. ATVes | 202-10-19-10 |
| CReviewed: W. Rance Roble Level: I Date: | 10-23-10 |

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¹⁵ SQ 6.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 137 of 523

| | | July Pa | |
|---|---------------------------------------|--|--------------------|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | | anna gu ann aile dhriot A C-fuillianna dh' channa ann ann ann ann ann ann ann ann an | |
| (8.1) Tendon No.: 1/-/34 Tendon End: | Top Des | hop 🔲 F | iëld |
| (9.5.1) DURING REMOVAL OF GREASE CAP Water Detected: Yes Hoo Quantity: Moisture Description: Observable Moisture Comments: NonQ | Sample Taken: Significant Moisture | Yes No No | 8 N/A |
| (9.6.1) INSIDE GREASE CAP Water Detected: Yes SNo Quantity: <u>0</u> Moisture Description: Observable Moisture Comments: <u>None</u> | Sample Taken: Significant Moisture | Yes No Not Applicable | ₹ E T N/A |
| | Sample Taken: Significant Moisture | Yes No Not Applicable | € ŢN/A |
| (9.9.1) DURING DETENSIONING Water Detected: Yes No Quantity: Moisture Description: Observable Moisture Comments: | Sample Taken: Significant Moisture | Yes No | □ N/A |
| (11.1) NOTIFICATION Exelon Notified: Yes No Individual Name | N/A | Date: | - 1996 fui 1999 f |
| SAMPLE IDENTIFICATION AND STORAGE (12.2) Sample's adequately identified: Yes No (12.3) Samples stored at: | MA | | |
| QC Signoff: Ame C-Down QC Reviewed: W, Cance Kolton | Level: Level: | Date: <u>10-19-1</u> Date: <u>10-28-</u> | 9 - 10 |

| RSG | PSC PROCEDURE SQ 6.1 INSPECT FOR WATER Data Sheet 6.1 July 31, 2009 Page 1 of 1 Revision 0 |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (8.1) Tendon No.: 12-134 Tendon End: Bottom DS | hop Arield |
| (9.5.1) DURING REMOVAL OF GREASE CAP Water Detected: Yes No Quantity: <u>Sample Taken:</u> Moisture Description: Observable Moisture Significant Moisture Comments: <u>None</u> | Not Applicable |
| (9.6.1) INSIDE GREASE CAP Water Detected: Yes INo Quantity: O Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: None | □Yes □No 涨N/A |
| (9.7.1) AROUND TENDON ANCHORAGE COMPONENTS Water Detected: Yes Yes Tho Quantity: O Sample Taken: Moisture Description: Observable Moisture Comments: Now | Yes No XN/A |
| (9.9.1) DURING DETENSIONING Water Detected: Yes No Quantity: Sample Taken: Moisture Description: Observable Moisture Significant Moisture Comments: | Yes No N/A |
| (11.1) NOTIFICATION Exelon Notified: Yes INo Individual Name: | Date: |
| SAMPLE IDENTIFICATION AND STORAGE (12.2) Samples adequately identified: Yes No (12.3) Samples stored at: | |
| QC Signoff: C Level: QC Reviewed: W, Rance Poble Level: | Date: <u>/0-20-/0</u> Date: <u>10-28-10</u> |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report

| | Page | | | | |
|--|---|--|---|--|------------------|
| Station: TMI Unit: | 1 Date: / c | -19-10 | Repo | rt No: N/A | |
| WO NO(S) R 2139507 | Tendon Anch | orage No.: | | ion End: Shop | Field |
| Location: (Tunne) Gallery, Buttress | 3 . | Elevation | 1: 456-2" Bear | ing Plate I.D.: "In | ble to cate |
| | Anchor Head I.D.E | (1~7 | Bushing | 1.D. 1058 | |
| Exam Type: DV 2VT-1 | | | Type Of Exam: 🙀 | | |
| As Found Exam | As Left Exam Follo | | | hich Have Been D | etentione |
| Design Drawing(s) TMJ 2-0016 | Visua Teat Card UTC | al Aids: None or Serial No. | NA | | nd - |
| M&TE Used: Steel Rule Roze Color E Illumination Used Flash / 1 + | | ination Verified | | Cal. Due Date: * | 12:50 P.1 |
| Special / Specific Instructions: | 1/4 | | . Date. /0 /4-/(| o nine. | 12:30 100 |
| Component / Item Number and | RESULTS | | Explana | ation / Notes | |
| Description | NI RITYPE | IO (Ske | tch Shall Be Attach | ed Depicting Loca | |
| | | | Missing, Protrud | ing, Unseated Wire | es) |
| Anchorage components on Tendon V-134 shop/Top. | | No | indications | | |
| | | | | | |
| Results Legend: NI - No Inc | Recordable In | dication Type Co | IO – Information O | | |
| NI - No Inc A. Missing Wires | Recordable In H. | dication Type Co Cracks | | | her (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires | Recordable In | dication Type Co Cracks Pitting | | O. Oth | l ier (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires | Recordable in H. I. J. K. | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim | odes: , Mechanical Damag Stack | O. Oth | l ier (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion | Recordable In H. I. J. K. L. | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shir | odes: , Mechanical Damag Stack n Gaps | O. Oth | ler (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif | Recordable in H. I. J. K. L. M. Y. | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shir Gasket Seating Surface Discor | odes: , Mechanical Damag Stack m Gaps g Surface Damage htinuities, Deflections | O. Oth e | l ner (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif | Recordable In H. I. J. K. L. M. N. No Sketch | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shin Gasket Seating Surface Discor | odes: , Mechanical Damag Stack n Gaps g Surface Damage ntinuities, Deflections ideo Other (De | O. Oth e | ler (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Yes | Recordable in H. I. J. K. L. M. Y. | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shin Gasket Seating Surface Discor | odes: , Mechanical Damag Stack n Gaps g Surface Damage ntinuities, Deflections ideo Other (De | O. Oth e | ner (Explai |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Ares | Recordable In H. I. J. K. L. M. N. No Sketch | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shin Gasket Seating Surface Discor | odes: , Mechanical Damag Stack m Gaps g Surface Damage ntinuities, Deflections ideo Other (De | O. Oth e scribe): | |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Stres [EXAMINER/EVALUATOR (Print & Sign) Tinothy C. Gibun | Recordable In H. I. J. K. L. M. Y) No Sketch Results: Accepta | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shin Gasket Seating Surface Discor Photo | odes: , Mechanical Damag Stack n Gaps g Surface Damage ttinuities, Deflections ideo Other (De No LEVEL _7 | O. Oth e scribe): TDATE | 10- 19-20 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Ares EXAMINER/EVALUATOR (Print & Sign) Timothy C. Gibun STATION/ADMIN REVIEW | Recordable in H. J. J. K. L. M. Y) No N. Sketch Results: Accepta | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shin Gasket Seating Surface Discor Photo | odes: , Mechanical Damag Stack n Gaps g Surface Damage ttinuities, Deflections ideo Other (De No LEVEL _7 | O. Oth e scribe): | 10- 19-20 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Ares EXAMINER/EVALUATOR (Print & Sign) Timothy C. Gibun STATION/ADMIN REVIEW | Recordable In H. J. K. L. M. Y) N. No Sketch S Results: Acceptar | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shir Gasket Seating Surface Discor Photo V ble | odes: , Mechanical Damag Stack m Gaps g Surface Damage ntinuities, Deflections ideo Other (De No LEVEL <u>1</u> | 0. Oth e scribe): TDATE DATE | 10-19-20 510 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Deres [EXAMINER/EVALUATOR (Print & Sign) Timothy C. Gibun STATION/ADMIN REVIEW (Print & Sign) Fill This section to be completed RI or Unacceptable results Accepting Complementable results Accepting Missing Wires B. Missing Button Heads D. Broken Wires B. Missing Button Heads C. Protruding / Unseated Wires B. Missing Button Heads C. Protruding / Unseated Wires B. Missing Button Heads C. Protruding / Unseated Wires B. Missing Button Heads C. Protruding / Unseated Wires C. Protruding / Unseated Wires B. Missing Button Heads C. Protruding / Unseated Wires B. Missing Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Deres [C. Constant C | Recordable in H. J. K. L. M. Y) N. No Sketch 2 Results: Accepta M. C. Sub- M. Tolosson ted only if Examin | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shir Gasket Seating Surface Discor Photo V ble | odes: , Mechanical Damag Stack m Gaps g Surface Damage ntinuities, Deflections ideo Other (De No LEVEL <u>1</u> | 0. Oth e scribe): TDATE DATE | 10-19-20 510 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Pres [EXAMINER/EVALUATOR (Print & Sign) Timothy, C. Gibbon STATION/ADMIN REVIEW (Print & Sign) This section to be completed RI or Unacceptable results Accept Additional Actions: | Recordable in H. I. J. K. L. M. Y) N. No Sketch S Results: Accepta M. C. S. M. To Sketch Star M. To Sketch Star M. To Sketch Star M. Sketch Star M. Sketch Star M. Sketch Star M. Sketch Star Sketch S | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shim Gasket Seating Surface Discor Photo UV ble Yes | odes: , Mechanical Damag Stack m Gaps g Surface Damage ntinuities, Deflections ideo Other (De No LEVEL <u>1</u> | 0. Oth e scribe): TDATE DATE | 10-19-20 510 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion F. Other Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Dres [EXAMINER/EVALUATOR (Print & Sign) Timothy C. Gibun STATION/ADMIN REVIEW (Print & Sign) For the section to be completed RI or Unacceptable results Accepting | Recordable in H. I. J. K. L. M. Y) N. No Sketch S Results: Accepta M. C. S. M. To Sketch Star M. To Sketch Star M. To Sketch Star M. Sketch Star M. Sketch Star M. Sketch Star M. Sketch Star Sketch S | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shim Gasket Seating Surface Discor Photo UV ble Yes | odes: , Mechanical Damag Stack m Gaps g Surface Damage ntinuities, Deflections ideo Other (De No LEVEL <u>1</u> | 0. Oth e scribe): TDATE DATE | 10-19-20 510 |
| A. Missing Wires B. Missing Button Heads C. Protruding / Unseated Wires D. Broken Wires E. Active Corrosion G. Evidence Of Free Water (Quantif Supplemental Information : Pres [EXAMINER/EVALUATOR (Print & Sign) Timothy, C. Gibbon STATION/ADMIN REVIEW (Print & Sign) This section to be completed RI or Unacceptable results Accept Additional Actions: | Recordable In H. I. J. K. L. M. Y) N. No Sketch 2 Results: Accepta M. C. Site C. Site Sted only if Examinated only if Examinated for Corrective | dication Type Co Cracks Pitting Nicks, Gouges Uneven Shim Excessive Shim Gasket Seating Surface Discor Photo UV ble Yes | Ades: , Mechanical Damag Stack m Gaps g Surface Damage ntinuities, Deflections ideo Other (De No LEVEL 7 notes RI or Una | 0. Oth e scribe): TDATE DATE | 010 |

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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| | raye | | | | | |
|--|-------------------------------|---|--|--|---|---------------|
| Station: TMI Unit: | 1 Date: 10 | 7-19-10 | | Report No: 🗸 | 1/A | |
| WO NO(S): R2/39507 | Tendon Anc | - 1 | U-134 | Tendon End | | Field |
| Location: Tunnel, Gallery Buttres | 55. | Elevati | ion Gullery | Bearing Plat | e I.D.: wrable | to locar |
| Bearing Plate I. D. Unable to locate | Anchor Head ID | FAFY27R2 | | Bushing I.D. | TA. | |
| Exam Type: DV AVT-1 | 200- | 170 170 | the second second second second second second second second second second second second second second second s | xam: Direct | Remote | |
| As Found Exam | As Left Exam Follo | owing Retensi | | idons Which Ha | ive Been Deter | ntioned |
| Design Drawing(s) TMI 1-0016 | | al Aids: راي ا | ine | | | |
| M&TE Used steel Rule R-CC 6-28-11 | | or Serial No. | | | ue Date: | |
| Illumination Used Flush high4 | | nination Verifie | ed: Date: | 10-19-10 | Time: 8:00 | O AM |
| Special / Specific Instructions: | MA | | | | | |
| Component / Item Number and | RESULTS | | | Explanation / N | | 01 A U |
| Description | NI RITYPE | (O (Sk | | e Attached Dep Protruding, Uns | | |
| Anchorant for 12134 | | N | 'o indica | ations. | | |
| Anchorage For V134 Field End. | | • | | | | |
| Field end. | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| Results Legend: | - dia-Nana - Ot Ora | | 10 1.(| | | 1 |
| NI - NO 1 | | ordable Indication Indication Type (| | mation Uniy | | k |
| A. Missing Wires | H. | Cracks | 00003. | | 0. Other (| Explain) |
| B. Missing Button Heads | ł. | Pitting | | | | , |
| C. Protruding / Unseated Wires | J. | | es, Mechanica | Il Damage | | |
| D. Broken Wires E. Active Corrosion | K. | Uneven Shin Excessive SI | | | | |
| F. Other Corrosion | M. | | ing Surface Da | amage | | |
| G. Evidence Of Free Water (Quan | | Surface Disc | continuities, De | | | |
| Supplemental Information : Bres | No ASketch | Sphoto [| Video 🗌 O | ther (Describe): | | |
| | Results: Accepta | able 🛛 🕅 | S No | | | |
| EXAMINER/EVALUATOR | Mr 1.t | | | | | - + |
| (Print & Sign) Timothy C. Gibson /4 | my com | | LEVE | L II- | DATE 10-M | 9-14 |
| STATION/ADMIN REVIEW |) solating | \sim | | DATE | 10/20/20/0 | |
| (Print & Sign) | varvome L | | | DATE | and the second second second second second second second second second second second second second second secon | |
| This section to be compl | | | or notes RI | or Unaccepta | able conditio | n. |
| RI or Unacceptable results Acce | ptable 🗌 Yes | No No | | · | | |
| Additional Actions: | | | | | | |
| (Action Request, Work Order, Issue Report, | etc. initiated for Corrective | Action) | | | | |
| LEVEL III or RI REVIEW (as applied | able) | | | DATE | | |
| ANII REVIEW (as applicable) | sept 1 Stelly | | | DATE | 12-1-10 | |
| LEVEL III or RI REVIEW (as applic | | | | ······································ | 12-1-10 | |

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ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Report No: N/A Unit: Date: 10-19-10 Station: 1 MI System Tendons Component: Convete 24" a round uncher plate V-134 WO NO(S) R 2139507 Building: Containnient Elev.: 456-2" Col.: N/A MA Row: Azimuth/Radius: 1/1 Location: Exam Type: DV GV XVT-1G XVT-3C Type Of Exam: Aftrect Remote Matl. Type: Concrete 1298-28-10 Visual Aids: None Design Drawing(s) TMI 1-0016 Surface / Components Coated: Surface: ID (0)YES RINO M&TE Usedylee Rule A.22 6-15 M Test Card NA UTC or Serial No. Cal. Due Date MA Illumination Used Flack licht Illumination Verified: Date: 10-19-10 Time: 12:30 PM Special / Specific Instructions: NA Component / Item Number and RESULTS Explanation / Notes Description (As a minimum, Record Location and Size of **RI TYPE** NI 10 (e.g. EIN, EID, etc.) Recordable Indications as applicable) Concrete area 24" around No indications Anchur Plate U-134 Shop end Top. **Results Legend:** NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: Cracks (Characterize and Size) Settlements Or Deflections Α. G. Μ. Scaling / Dusting **Degraded Patches or Repairs** Β. Exposed Reinforcing Steel H. N. Coating Deterioration С. Exposed Metallic Items (Other) I. Popouts, Voids, Honeycomb О. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls р Air Voids / Bug Holes **Cold Joint Lines** Ε. Evidence Of Moisture Κ. Q. Efflorescence **Corrosion Staining** F Leaching Or Chemical Attack Ł. R. Other (Explain) Supplemental Information : XYes No Sketch Sphoto Video Other (Describe); Results: Acceptable XYes]No **EXAMINER/EVALUATOR** TL DATE 10-19-10 LEVEL (Print & Sign) Timony C. Gibun STATION/ADMIN REVIEW 10/29/2010 DATE (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable **T**Yes **No** Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) DATE: ANII REVIEW (as applicable) DATE: 11-4-10 Page of

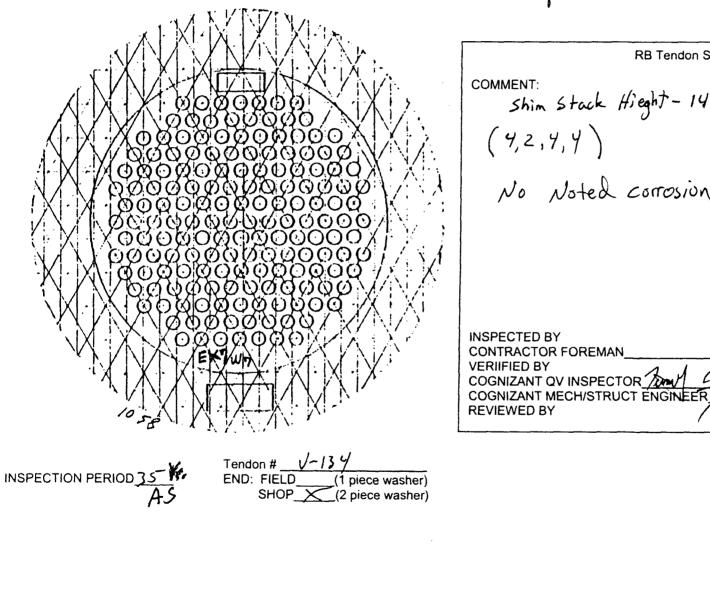
ER-AA-335-018

Revision 5 Page 32 of 32

ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Report No: M/A Unit: Date: Station: T 10-19-10 System Component: Concrete 24" around anchor Plate WO NO(S): R 2139507 U-134 Elev. Tendou Row: MA Col.: N/A Azimuth/Radius: 1/1 Location: Building: Containment Exam Type: DV GV XVT-1C -ST-30 Vype Of Exam: Direct Remote Matl. Type: Concrete Design Drawing(s) Tal Visual Aids: None 2-0016 Surface / Components Coated: Surface: ID YES ANO ത്ത M&TE Used Steel Rule K-12 5-18 - 11 STest Card UTC or Serial No. NA Cal. Due Date: Illumination Used Flash light Illumination Verified: Time: 8:00 AA Date: 10-19-10 Special / Specific Instructions: MA Component / Item Number and RESULTS Explanation / Notes Description (As a minimum, Record Location and Size of **RI TYPE** NL 10 (e.g. EIN, EID, etc.) Recordable Indications as applicable) Concrete area 24" No indications around anchor plate 11-134 field end. **Results Legend:** RI - Recordable Indication IO - Information Only NI - No Indications Recordable Indication Type Codes: Settlements Or Deflections Α. Cracks (Characterize and Size) G. Μ. Scaling / Dusting Β. Exposed Reinforcing Steel H. **Degraded Patches or Repairs** N. **Coating Deterioration** C. Exposed Metallic Items (Other) 1. Popouts, Voids, Honeycomb О. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bua Holes **Cold Joint Lines** Ε. **Evidence Of Moisture** K. Q. Efflorescence **Corrosion Staining** F Leaching Or Chemical Attack L. R. Other (Explain) Sketch Stehoto Supplemental Information : STYes No Video Other (Describe): Results: Acceptable **INo** Ates EXAMINER/EVALUATOR 10-19-10 LEVEL DATE (Print & Sign) Timothy C. Gibson STATION/ADMIN REVIEW DATE 10/29 /2010 (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable **N**Yes □ No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) DATE: ANII REVIEW (as applicable) iash DATE: 12-1-10 Page ____ of]

Date 29

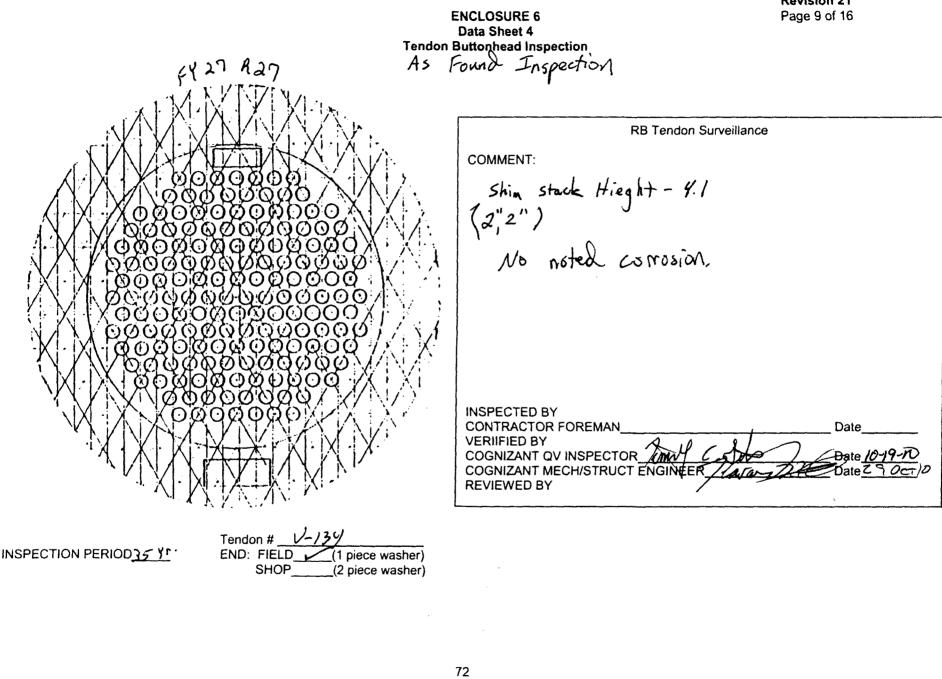
ENCLOSURE 6 Data Sheet 4 Tendon Buttonhead Inspection As Found Inspection



Topical Report 204 Revion 0 Attachment 8.7 Page 144 of 523

RB Tendon Surveillance COMMENT: Shim Stack Hieght - 14.4" (4,2,4,4) No Noted corrosion **INSPECTED BY** CONTRACTOR FOREMAN Date VERIIFIED BY Date 10-19-10

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Topical Report 204 Revion 0 Attachment 8.7 Page 145 of 523



PSC PROCEDURE SQ 7.1 INSPECTION DOCUMENTATION DATA SHEET 7.1 July 31, 2009 Page 1 of 1 Revision 0

| Ext. Major QL - S Z. Y - S - I/ Sur / Sur / Iz - zs Ext. Pitch QL - S Z. Y - S - I/ Sur / S - Z - Y/-S - I/ Sur / Iz - zs Ext. Minor QL - S Z. Y - S - I/ June / S - Z - Y/-S - I/ Sur / Sur / Iz - zs Minor QL - S Z. Y - S - I/ June / June / June / Iz - zs Int. N/A N/A N/A N/A Minor Sur / June / June / MEASUREMENTS THREAD Average Wire Wire Shim Average Ext. 1 9.77/ 9.77 June / Size June / June / Pitch (1) 2 0.772 9.570 .254 .032 9.12 Ext. 1 1.569 9.571 9.570 .254 .032 9.12 Pitch (1) 2 0.572 9.456 9.457 .032 9.12 Int. 1 N/A N/A N/A .032 9.12 Int. 1 N/A N/A N | Ext. Major | | | METER | | | WIR | ,E | | SHIM | S |
|---|---------------|---------------|---|---|-----------------------|-----------------------|---------------|----------|---------|---------------|------------|
| Major $QL - S^2Z$ $Y - S - II$ $Se \pm S$ $6 - 2S^2II$ Sur_I $I_2 - 2S^2II$ Ext. $QL - S^2Z$ $Y - S^2 - II$ $Se \pm S$ $6 - 2S^2II$ Sur_I $I_2 - 2S^2III$ Int.N/AN/AN/AN/A $I_2 - 2S^2III$ Sur_I $I_2 - 2S^2IIII$ Int.N/AN/AN/AN/AN/A $I_2 - 2S^2IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII$ | Major | l wi | c ID | Recal | Dăte | IC | No. | Recal Da | ite I | D No. | Recal Date |
| Ext. Pritch $QC-5^{-}$ $Y-5-11$ $Se + 5$ $6-25^{-}11$ $Sw + 1$ $12-23$ Int. MajorN/AN/AN/A $12-25^{-}10$ $Sw + 3$ $12-25^{-}10$ $Sw + 3$ $12-25^{-}10$ Int. MajorN/AN/AN/AAverageWire ConstantShim DiameterShim SizeAverageMEASUREMENTS. ThreadTHREAD ReadAverageWire ConstantShim DiameterAverageMEASUREMENTS. ThreadTHREAD ReadAverageWire | | QL | -52 | 4-5- | -11 | | | | | | |
| Ext. Minor QC-5 ⁻ Y-5-11 Q-K R&/Blue 12-25-10 Sur 3 12-22 Int. Major N/A | | | | 1 | | Set | -5 | 6-25-11 | Su | .c / | 2-23-10 |
| Int. Major N/A N/A N/A Int. Minor N/A N/A N/A N/A N/A Minor N/A N/A N/A N/A N/A N/A Minor N/A N/A N/A N/A N/A N/A N/A Minor N/A N/A N/A Average Wire Oiameter Shim Average Ext. 1 9.77/ 9.327 9.327 9.570 2.574 9.32 9.3 Ext. 1 9.572 9.570 9.570 2.574 .032 9.2 7.2 Ext. 1 9.572 9.570 2.574 .032 9.2 7.2 Ext. 1 9.576 9.570 2.574 .032 9.2 7.2 Int. 1 N/A N/A N/A 9.456 9.457 .240 .032 9.2 Int. 1 N/A N/A N/A N/A | Ext. | | | 1 | | 0-h Red | 1 Blue | 12-25-10 | | | 12-25-10 |
| Int. Minor N/A N/A MEASUREMENTS THREAD Average Wire Constant Wire Diameter Shim Size Average Ext. 1 9,77/ 9,372 9,324 9,324 9,324 Ext. 1 9,77/ 9,372 9,327 9,327 9,327 Ext. 1 9,569 9,577 2,574 2,032 9,2 Pitch (1) 2 0,572 2,570 9,570 2,574 2,032 9,2 Ext. 1 149,6 1,945 9,457 2,570 2,574 2,032 9,2 Ext. 1 149,6 1,945 9,457 2,570 2,574 2,032 9,2 Int. 1 N/A N/A 1,454 | Int. | 1 | | T | | | | | | | |
| Thread Read 3 rd 6 th 9 th Average Constant Diameter Size Diameter Ext. 1 9,77/ 9,372 9.397 1 9.37 <td>Int.</td> <td>Ň</td> <td>I/A</td> <td>N/</td> <td>IA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | Int. | Ň | I/A | N/ | IA | | | | | | |
| Thread Read 3 rd 6 th 9 th Average Constant Dlameter Size Dla Ext. 1 9,77/ 9,372 9.379 9.3 | MEASUREME | NTS | | THREAD |) | | | Wire | Wire | Shim | Averag |
| Ext. 1 9,77 9,372 9,329 9,37 | Thread | Read | 3 rd | | | | erage | | | | Diamete |
| Ext. 1 9.569 9.570 9.570 9.570 . 254 . 03 2 9.2 Pitch (1) 2 9.572 1 9.570 9.570 9.570 . 254 . 03 2 9.2 Ext. 1 1.956 9.950 9.457 . 254 . 03 2 9.2 Ext. 1 1.956 9.457 . 257 . 240 . 03 2 9.2 Int. 1 N/A 9.457 . 240 . 240 . 03 2 9.2 Int. 1 N/A N/A N/A N/A . 240 . 03 2 9.2 Int. 1 N/A N/A N/A N/A . 240 . 03 2 9.2 Int. 1 N/A N/A N/A N/A . 240 . 03 2 9.2 Int. 1 N/A N/A N/A N/A . 240 . 03 2 9.2 Int. 1 N/A N/A N/A N/A Recal Date: N/A Result: N/A Pitch No-Go Gauge N/A< | | | | | | | | | | | 9.372 |
| Ext. 1 1.956 1.964 9.957 0.32 9.9 Int. 1 N/A N/A N/A 9.957 .240 .032 9.9 Int. 1 N/A N/A N/A N/A 1.00 .240 .032 9.9 Int. 1 N/A N/A N/A N/A N/A 1.00 .240 .032 9.9 Int. 1 N/A N/A N/A N/A .00 | Ext. | 1 | 9.569 | | 9.571 | a c | 20 | 2.54 | | | |
| Minor (2) 2 9.45 9.457 .240 .632 9.45 Int. 1 N/A | | tere mine and | <u> </u> | and the second se | | | | | (.120) | <u> 703 C</u> | |
| Major 2 N/A N/A N/A N/A N/A Int. 1 N/A N/A N/A N/A N/A N/A Minor 2 N/A N/A N/A N/A N/A N/A Int. Go Gauge ID: N/A N/A Recal Date: N/A Result: N/A Pitch No-Go Gauge N/A Recal Date: N/A Result: N/A Otes: (1) External Pitch Diameter = [Average] - [Wire Constant] - [Shim Size] (2) External Minor Diameter = [Average] - [2 X Wire Diameter] - [Shim Size] DISPOSITION Trial 1 Trial 2 Trial 3 Trial 4 | Minor (2) | | | | | 9,45 | -7 | | .240 | 1032 | 9.185 |
| Int. 1 N/A N/A N/A Minor 2 N/A N/A N/A N/A Int. Go Gauge ID: N/A N/A Recal Date: N/A Result: N/A Pitch No-Go Gauge N/A Recal Date: N/A Result: N/A Pitch No-Go Gauge N/A Recal Date: N/A Result: N/A Otes: (1) External Pitch Diameter = [Average] - [Wire Constant] - [Shim Size] [2) External Minor Diameter = [Average] - [2 X Wire Diameter] - [Shim Size] [2] DISPOSITION Trial 1 Trial 2 Trial 3 Trial 4 | | | in the second second second second second second second second second second second second second second second | | 4 | | | | | 1 Contraction | |
| Minor 2 N/A N/A N/A Int. Go Gauge ID: N/A Recal Date: N/A Result: N/A Pitch No-Go Gauge N/A Recal Date: N/A Result: N/A Dites: (1) External Pitch Diameter = [Average] - [Wire Constant] - [Shim Size] (2) External Minor Diameter = [Average] - [2 X Wire Diameter] - [Shim Size] DISPOSITION Trial 1 Trial 2 Trial 3 Trial 4 | | | | | | | | | | | |
| Int. Go Gauge ID: N/A Recal Date: N/A Result:: N/A Pitch No-Go Gauge N/A Recal Date: N/A Result:: N/A otes: (1) External Pitch Diameter = [Average] - [Wire Constant] - [Shim Size] (2) External Minor Diameter = [Average] - [2 X Wire Diameter] - [Shim Size] DISPOSITION Trial 1 Trial 2 Trial 3 Trial 4 | | | | | | | | | | | |
| Pitch No-Go Gauge N/A Recal Date: N/A Result: N/A ID: | | | | | <u> </u> | <u>Restance</u> | Recal Dr | ate: N/ | A | Result: | N/A |
| otes: (1) External Pitch Diameter = [Average] - [Wire Constant] - [Shim Size] (2) External Minor Diameter = [Average] - [2 X Wire Diameter] - [Shim Size] DISPOSITION Trial 1 Trial 2 Trial 3 Trial 4 | Pitch | No-C | | | IÀ. | | Recal Da | ate: N/ | Ά | Result: | N/A |
| | (2) External | Minor Dia | meter = | [Average] | – [Wire] – [2 X ' | Constant Wire Diam | ieter] - [Shi | im Size) | | | ÷ 1 |
| Adaptor Mark D Z | | | | | Adapto | r Mark | DZ | That 2 | 11101 3 | <u> </u> | 4 |
| Min. Minor Diameter from Adaptor Table 8.645 | | Min. M | vinor Diar | meter fron | | - | | | - | | |

| | | | | DATA SH Lift-Off Force N | | | 1301-9.1 Revision 21 Page 1 of 1 |
|---|--|--|---|---|---|---|--|
| Surveillance N | No. 354. | Tendon ID <u>1-139</u> | Predi | cted Force (F _p)_ | <u>1332 kip</u> | Tendón End (Circle | e One): Shop / Field |
| Phase (Circle | One) As-found / | Re-Tension | Ram ID 646 | 0 -9400 | Ram Calibrat | ion Constants: A = こび | 5.787 k=-6.961 |
| Date 10-19- | 10 Temp: F | RB Interior /09 °F | (~). | 0.3 000 | No. Effective | Wires, N <u>. 169</u> Shi | m Stack Ht. <u>19.9</u> in. |
| | | DO NOT EXCEEP A RA | AM PRESSURE O | CAUTION F [(1,592 × N _w / | 169) — k] × 1,00 | 0/A = <u>6181-37</u> psig | |
| Trial 1 2 3 4 5 6 7 8 9 10 | Lift-Off Pressure, psig <u>5720</u> <u>5720</u> 5720 | Consecutive Three Trial Pressure Spread psi <u>N/A</u> | Consecutive Three Trial Pressure Average p ¹ psig ^{1,2} N/A N/A S720 | At Feeler Ga | At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | ner Rotation Rotation, Turns CW or CCW 0 0 0 1,000) = k = <u>134/.74</u> kip | For Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead |
| ² Re-tension f For Re-Tensi Notes: | P range: P' _{min} = (F _r ion Only: F _p < End / DAR | Lift-Off Force < 1394 | ⊈ psig < P' < P' _m x N _w / 169;∕ | <u>A_ < N/</u> | 4 <^ | 100 / A = <u>17/</u> psig <u>1/A</u> Yes / No <u>W. Pance Polle</u> _{QV} | (Circle One) Date <u>10-28-1</u> 0 |
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| RSS | · | | PSC PROCEDURE SQ 12 REPLACE GREASE CA Data Sheet 12 July 31, 200 Page 1 of Revision |
|-------------|--|------------|--|
| Project: T | MI 35 TH YEAR TENDON SURVEILLANCE | | in an amin' an an an an an an an an an an an an an |
| Tendon No.: | V-13Y Tendon End: Top | Shop | Field |
| | ANCHORAGE INSPECTION CRITI | ÊRIA | |
| | BEARING PLATE SURFACE PROPERLY PREPARED: | RYES | |
| | GREASE CAP SURFACE PROPERLY PREPARED: | YES | |
| | GASKET MATING SURFACE PROPERLY PREPARED | YES | |
| | STUD/BOLT HOLES PROPERLY PREPARED; | YES | |
| | FOREIGN MATERIAL EXCLUSION CONTROLLED: | VES | |
| | COMMENTS None | | |
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| CREWEOP | MAN SIGNOFE AMELIAND | | |
| CREW FORE | MAN SIGNOFF CHEURA | | Date: <u>10-19-10</u> |

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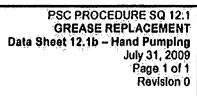
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|-------------|---------------------------------|----------------|----------------|--------------|----------------------|-------------|
| Project: T | MI 35 TH YEAR TENDON | SURVEILLANCE | | | | |
| Tendon No.: | U-134 | Tendon End: | Bottom | Shop | Field | |
| | | ANCHORAGE IN | SPECTION CRITE | RIA | | |
| | BEARING PLATE SUI | RFACE PROPERLY | PREPARED: | N YES | | |
| | GREASE CAP SURFA | | EPARED: | YES | NO | |
| | GASKET MATING SU | RFACE PROPERLY | PREPARED: | YES | | |
| | STUD/BOLT HOLES F | | RED: | YES | | |
| | FOREIGN MATERIAL | EXCLUSION CONT | ROLLED: | VES | | |
| | COMMENTS No | 18 | | | | |
| | | | | | | |
| | | • | | | | |
| | | | | | | |
| CREWFOR | | telehr | -9 | | Date: <u>/() - /</u> | <u>9-10</u> |
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25 SQ 12.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 149 of 523 ,



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| Project: TMI 35 th YEAR TENDON SURVEILLANCE | Tendon No.: <u>V</u> - | 134 |
|--|--|------------------------------|
| GREASE REPLACEMENT | | QC SIGNOFFS |
| | APPROVAL LETTER DATED: | WRR 10-21-10 |
| (8.5) Total Grease Loss from Data Sheet 6.0 for Field Callery tendon end: | gal. | WRP 10-21-10 |
| (8.6) Total Grease Loss from Data Sheet 8.0 for Top/shep lendon end | 7 gal. | NRR 10-21-10 |
| (8.7) Estimated grease losses from leaks for Field /Gallery tendon end: | O gal. | WRR 10-21-10 |
| (8.8) Estimated grease losses from leaks for Tap/shop_tendon end: | O gal. | WRR.10-21-10 |
| (8.9) TOTAL Tendon Grease Loss: | 8 gal | WRR 10-21-10 |
| 13.0 POURING AND HAND PUMPING - FIRST END | | |
| (13.6) Ambient Temp.: 55 °F Thermometer ID: PK 102 Recal Date: 2 | 9-11 | |
| (13.7) Grease Temp.: 210 °F Thermometer ID: PK102 Recal Date: 2 | 2-9-11 | |
| (13.9) Initial Grease Height (a) 3/ in. (13.12) Final Grease Height (b) | 26 in: | |
| (13.14) Total amount of Grease added: 8,85 gal. (a - b) x 1.77 Into the S | hop/Top end | |
| (13:15) Quantity of Waste Grease: | land Pumped | |
| (13.17) Total Grease <u>Replaced</u> this end: 8,85 gal. | | WRR 10-21-10 |
| 13.0 HAND PUMPING - SECOND END | فيستشب المتعادين والمتعاد والمتعاد والمتعاد والمتعاد والمتعاد والمتعاد والمتعاد والمتعاد والمتعاد والمتعاد وال | |
| (13.6) Ambient Temp:: •F Thermometer ID: / Recal Date: | | |
| (13.7) Grease Temp.: PF Thermometer R: | | |
| (13.9) Initial Grease Height (a) In. (13.7) Final Grease Height (b) | ìn. | |
| (13.14) Total amount of Grease added: | énd | 9) 8 8 4 |
| (13.16) Quantity of Waste Grease: gal. (13.15) Poured | land Pumped | 1 1 1 1 1 |
| (13-17) Total Grease Replaced this end: | | WRR 102F10 |
| 14.0 CALCULATION OF PRESSURE PUMPING | * | |
| (14.1) Total Tendon Grease Replaced: <u>8,85 gal.</u> (13.17 + 13.17) | | |
| (14.2) Net Tendon Duct Grease Volume: 131,62 gal. Refer to SQ 12.2 - GREASE VOLUMES, for in | e Tendon Nél Dúčt Volume | |
| (14.3) Percent Difference: Total Tendon Replaced (14.1) - Total Tendon Loss (8.9) Net Tendon Duct Grease Volume (14.2) × 100 = | 64 % Difference | 12212.21.0 |
| (14.4) Grease Leaks: Yes X No | | WKR 10-21-10 WKR 10-21-10 |
| (14.5) Refill Acceptable: Xes (less than 10%) INO (greater than 10%) | | WER DZI-10 |
| (14.6) Comments: Now | | 11122/021-1D |
| INDARCE IN THE REAL PROPERTY OF THE REAL PROPERTY O | | |
| Reviewed: The C. Mars Level: | Date: 1027- | j d |
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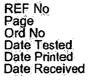
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Z6 SQ 12.1 TM 09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 150 of 523 Exova 194 Internationale Boulevard Glendate Heights Illinois USA 60139 1: +1 (630) 221-0385 F: +1 (630) 221-0796 E: sales@exova.com W: www.exova.com



Test Certificate

Precision Surveillance Corp 3468 Watling Road East Chicago, IN 46312



: Issue 1

T 020357

11/18/10

11/15/10

1 of 1 1096 11/18/10

Attn: Gerrald Bussone

Item - TENSILE TESTING OF Six 1/4" DIAMETER TYPE BA WIRE

Specification - ASTM-A370-09A & A421/A 421M-06

| | Dimensions [in] | Area [tin ²] | GL [in] | 0.20%YS [psi] | UTS Cps13 | %E1 | % RA | Comments |
|-----------------------|--------------------|-----------------------------|---------------------------------------|------------------|--------------|-----|-------------|----------------------|
| 001:Parent | 0.2500 | 0.0491 | 10.00 | 212900 🗸 | 247300 | 4.5 | 47.0 | V118 Shop/Top #1 |
| 002:Parent | 0.2500 | 0.0491 | 10.00 | 207000 🖌 | 246200 | 5.9 | 47.7 | V118 Shop/Top #2 |
| 003:Parent | 0.2500 | 0.0491 | 10.00 | 208500 | 246600 | 5.4 | 48.7 | V118 Shop/Top #3 |
| 004:Parent | 0.2500 | 0.0491 | 10.00 | 236200 | 267000 | 5.1 | 44.6 | H46-39 Shop/Butt6 # |
| 005:Parent | 0.2500 | 0.0491 | 10.00 | 238600 | 269900 | 5.6 | 47.0 | H46-39 Shop/Butt6 #2 |
| 006:Parent | 0,2500 | 0.0491 | 10.00 | 233200 | 267400 | 4.6 | 43.4 | H46-39 Shop/Butt6 #3 |
| Specification Minimum | | | · · · · · · · · · · · · · · · · · · · | 199750 | 235000 | | · | |
| Specification Maximum | | | | | 1 | | | |

Certificate Comments

The preceding testing was performed in accordance with Exova Americas Materials Division QA Manual Issue 2, 2/1/2010.

Mark K Goodyear

Test Engineer For and on behalf of Exova Inc.

PSC gra. RE *YIEWED* ssone \dot{v} : 11/18 DATE:



The recording of false, selfous or traudulent statements or enfies may be punished as a felony under federal law. This certificate should not be reproduced other than in full, without the written approval of Exora, 194 Internationale Brid: Glendale Heights, IL, USA, 30139... These results pertain only to the liem(s) tested as sampled by the client unless otherwise indicated. Testing has been conducted to specification revision tereds as described in the laboratory document control procedure: Information regarding distingtion of measurement uncertainty (where appropriate) available upon request.

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ENCLOSURE 4 Data Sheet 2 Tendon Wire Test Results

| | | | idon whe lest hesuits | | |
|--|---|--------------------------------------|--|--------------------------------------|--|
| PECTION PERIOD | 2010 Augmented exo | -m | | | |
| TENDON WIRE ⁽¹⁾ SAMPLE NO. | LOCATION ⁽²⁾ FROM END OF WIRE | YIELD ⁽³⁾ STRESS (ksi) | ULTIMATE STRESS (ksi) | PERCENT ⁽⁴⁾ ELONGATION | COMMENTS (IDENTIFY MOST CORRODED SECTION |
| OME | an an an an an an an an an an an an an a | | ······································ | ····· | |
| - | - <u> </u> | | | | |
| · | | | | | |
| | | | | | |
| ERTICAL | | | | | |
| <u> </u> | 0'-10' | 212,9 | 247.3 | 4,5 | |
| 2 | 90'-100' | 207.0 | 246.2 | 5,9 | |
| 3 | 170'-170' | 209.5 | २५८.८ | 5,4 | |
| OOP | | | | · | |
| 1 | 0'-10' | 236,2 | 267.0 | 5,1 | |
| 2 | 60'-70' | 234.6 | 269.9 | 5,6 | |
| 3 | 140'-150' | 233.2 | 267.4 | 4,6 | |
| DTES: | | | Laboratory Technician | | 5.4 |
| | 7 of this enclosure. om end of zero length as indi | cated on Data Sheet 1 of | Prepared By: | See Exova Wire | Date Test Results (Attachma |
| this enclosur | | | | | Date |
| | ensile Strength. | | Cognizant Mech/Struct | Engineer | Date 219/11 |

DATA SHEET 9 Tendon Anchorage Area Moisture/Free Water Inspection

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| | Tendon No. | Location | Moisture/Water | Dependence of Free Mainteen Michael Original Instant | D | Inspect. By |
|-----|---------------|----------|----------------|---|------------|-------------|
| 1 | H 46-39 | BT Y | (Yes or No) | Description of Free Moisture/Water-Quantity, Location | Date Insp. | (Initials) |
| | | - | | | 10-20-10 | 1.10, |
| 2. | <u>H46-39</u> | BTG | NO | N/A | 10-20-10 | WER |
| 3. | HY6-41 | BTY | _NO | ~/A | 10-20-10 | 200. |
| 4. | 446-41 | BTG | NO | N/A | 10-20-10 | WRR |
| 5. | U-117 | Top | NO | N/A | 10-25-10 | WRR |
| 6. | <u>V-117</u> | Bottom | NO | N/A | 10-26-10 | 1.00 |
| 7. | <u>U-118</u> | Тэр | NO | N/A | 10-19-10 | 203. |
| 8. | <u>U-118</u> | Bottom | <u></u> | V/A | 10-19-10 | 200. |
| 9. | V-119 | Top | NO | ~/A | 10-25-10 | NRR |
| 10. | <u>V-134</u> | Top | NO | N/A | 10-19-12 | 7.c.s. |
| 11. | <u>U-134</u> | Bottom | <u></u> | N/A | 10-19-10 | 201. |
| 12. | <u>U-119</u> | Bottom | NO - | N/A | 10-26-10 | 200. |

NOTE:

Location:

Hoop Tendons:

1 to 6 - Buttress number at

Vertical Tendons: Dome Tendons:

- end of tendon
- T or B Top or Bottom
- 1 to 6 Number of buttress nearest to end of tendon

Cognizant QV Inspector Date: 10-27-10 Verification By: /trèse Cognizant Mech/Strugt Engineer-**Review By:** FALL Howard

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.

ENCLOSURE 6

Data Sheet 2 Anchorage Assembly Surveillance Inspection Vertical Tendons

| | | | | | | | | | | rucar re | nuons | | | | | | | |
|-----------------|-------------------|---------------------------|--|-------------|-------------|-----------|-------------|--------------|-------------|-----------------|----------|-------------|--|---------------|----------|----------|-----------|-----------------------|
| INSPEC | | PERIO | D | 35 Yr | · AS | - | | | | | | | | | | | INSP. BY | VERIF. BY |
| TENDON | END | | BI | JTTONHEADS | | ST | RESSING | WASHER JT | | SHIM | S | | BEARING F | PLATE | DATE | COMMENTS | CONTR. | COGNIZANT QV INSP. |
| | | | NO. OF MISSING, BROKEN, AND/OR DAMAGED | ^ | <u> </u> | _ | / | ^ | | | <u> </u> | | | ` | | | | |
| I.D. 1 | Locatio 2 | n Co r r. 3 | | CORR. 5 | | CORR. | CRACKS | KETCHED | CORR. 11 | CRACKS | SKETCHED | CORR. 14 | CRACKS | SKETCHI 16 | ED 17 | 18 | 19 | 20 |
| 1. <u>U-J/7</u> | T-5 | NO | | NO | Yes | NO | NO | Yes | NO | NO | <u></u> | NO | NO | NO | 10-25-10 | | _NS_ | Yes |
| _ | B-F | NO | | <u></u> | Yes | NO | NO | Yes | NU | 10 | NO | NO | <u><u></u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u> | NO | 10-26-10 | | Yes | |
| 2.U-118 | | NO | _3_ | NO | Yes | NO | <u>_00_</u> | Yes | NO | NO | NO | 10 | NO | A E | 10-27-10 | None | 100 | Yes |
| | <u>T-5</u> | No | _3 | <u></u> | Yes | No | NO | <u>Yes</u> | NO | NO | NO | NU | _00_ | NO | - | ./ . | 1012010 | V.c |
| 3.17/19 | <u><u>T-5</u></u> | Yes yes | | <u></u> | Yes Yes | NO | NO_ | Yes | <u>_0/v</u> | <u><u> </u></u> | <u></u> | 04 | <u></u> | | 10-25-10 | None | NO | les |
| | BF | Jes | | NO | | <u>UN</u> | <u> </u> | <u> </u> | NO | NÖ | | NO | NO | NO | | | | |
| <u>10-134</u> | <u>B-F</u> | ND | _0 | No | Yes | þØ. | NO | les | NO | NO | NO | NO | NO | | 10-19-10 | None | NO | Yes |
| | <u>T-S</u> | ND | | NO | Yes | <u>00</u> | <u></u> | Yes | 10 | ND | <u></u> | NO | <u> </u> | NU | - | | | |
| 5 | | | <u> </u> | | | | | | <u> </u> | | <u></u> | | | | | | - <u></u> | |
| | | | | | | | | | | <u></u> | | | | | - | | | |
| 6. | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| <u>LEGE</u> | | | | | | | | | | | | | | | | | | |
| | | | NDON END- | | | | | | | | | | | | | | | |
| ? Y = YE | ES | IDE | ENTIFY TEN | DON END (SI | HOP OR FIEL | DI AND | TOP (T) (| OR BOTTOM | (B) OF | TENDON | | | | | | | | |

IDENTIFY TENDON END (SHOP OR FIELD) AND TOP (T) OR BOTTOM (B) OF TENDON

* - See Enclosure 6, Partu Sheet 4

70

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N = NO

ENCLOSURE 6

Data Sheet 3 Anchorage Assembly Surveillance Inspection Hoop Tendons

| INSPEC | | PERIO | D | 3 <i>5</i> Yr. | AS | | | | | - - | | | | | | | | |
|-----------------------|---------------|------------------|--|------------------------------|-------------------|----------------------|-----------------|-------------------|-----------------|------------|----------|---------------|---------|---------------|---------------|----------|-------------------------------|------------------------------------|
| TENDON | END | | e | UTTONHEADS | | s | TRESSING & N | S WASHER UT | | SHIM | S | | BEARING | PLATE | DATE INSP. | COMMENTS | INSP. BY CONTR. FOREMAN | VERIF. BY COGNIZANT QV INSP. |
| | | | NO. OF MISSING, BROKEN, AND/OR DAMAGED | | * | ~ ~ | | * | ~ | | ^ | | / | <u> </u> | \ | | | |
| I.D. 1 | Location 2 | 3 Corr. | WIRES | CORR. 5 | | D CORR | CRACK | S /SKETCHED 9 | 0 CORR 10 | CRACKS | SKETCHEI |) CORR. 13 | CRACKS | SKETCHE 15 | D 16 | 17 | 18 | 19 |
| 1 <i>H 46-2</i> 9 | 6-5 | NO | _0_ | NO | Yes | NO | NO | Yes | NO | ND | NO | NO | NO | NO | 10-20-10 | None | NO | Yes |
| 2 <i>HY6-4</i> 1 3 | | 20 0 0 | | <u>NO</u> <u>NO</u> NO | Yes Yes Yes | 02 02 02 02 | NO ND | Yes Yes Yes | <u>NO</u> NO | NO | | NO | | NO | 10-2070 | Nove | <u></u> | Yes |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | <u> </u> | | | | | | | | | | | | | | | | <u></u> |
| 6 | | · | · | | | | | | | | | | | | . <u></u> | | | |

 HEGEND

 GENERAL
 TENDON END-LOCATION

 Q
 Y = YES
 IDENTIFY TENDON END (SHOP OR FIELD) AND NUMBER OF BUTTRESS (1 TO 6) AT TENDON END

 Q
 N = NO

* - See Enclousure 6, Data Sheet 4

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Insp. By

Verify. By

ENCLOSURE 6 Data Sheet 6

Tendon Anchorage Area Concrete Crack Inspection

Vertical Tendons

Inspection Period 35 year AS

| Tendon <u>No.</u> | Location | Remarks about Cracking Pattern | Cracks with width >0.01" Location(A) <u>Width (IN.)</u> (B) | Date Insp. | Contr. Foreman | Cognizant <u>QV Insp.</u> |
|----------------------|----------|--------------------------------|--|---------------|-------------------|------------------------------|
| 1. <u>V-118</u> | Top_ | None | N/A N/A | 10-19-10 | NO | yes |
| | Bottom | NONE | N/A N/X | | | · |
| 2. <u>V-134</u> | Top_ | None | N/A N/A | 10-19-10 | ND | yes |
| | Bottom | NONE | N/A N/A | | | , |
| 3. <u>V-117</u> | Top | NONC | NA NA | 10-25-1D | NO | yes |
| | Bottom | NONR | N/A N/K | 10-26-10 | NO | yes |
| 4. <u>V-119</u> | Top | None | N/A N/A | 10-25-10 | NO | ves_ |
| | Bottom | straight live crack | Bottom TE lesthan.00" | 10-26-10 | NO | yes |
| 5 | ····· | | | | | ***** |
| | | | | | | |
| 6 | | | | | | |
| | | | ······ | | | |
| 7 | | | | | | |
| OTE: (A) Loca | ition: | | | 2 | | |

NC

Identify Tendon End (Shop or Field) and T or B - Top or Bottom of Vertical Tendon

(B) If concrete crack width > 0.01", provide sketch

Cognizant Mech/Struet Engineer Reviewed By: alan 1-lowaro HILL

Date: 29 OCT/D

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ENCLOSURE 6 Data Sheet 7 Tendon Anchorage Area Concrete Crack Inspection Hoop Tendons

| Tendon No. Location Remeta about Crucking Pattern Concels with width PO.11* Date Insp. By Verify, By 1. H41639 BuHt, 4 MONC MONC MAR N/A MONC MONC Verify, By 2. H41641 Buft, 4 MONC MAR MONC MAR MONC Verify, By 3. | | = 35th year AS | , lendon / | Anchorage Area Concrete Crack Inspec Hoop Tendons | tion | | |
|---|-----------------|---|--|--|--|--|---|
| 2 H4641 Butt 4 NOME NO Ves 2 H4641 Butt 4 NOME N/A N/A N/A NO Ves 3 | | Location | | | | | Verify, By <u>Cognizant QV Insp.</u> |
| 2. H4(4) Butt 4 NONC N/A N/A D20-D NO 405 3. | 1. <u>H46</u> . | 39 Butt. 4 | NONE | N/A N/A | 10-20-10 | NO | _ves |
| 2. H4641 Butt 4 NONC N/A N/A N/A D20-D NO yes 3. Image: State of the state of | | Butt. 6 | 6" long stress crack | Bittress 6 less than . 00" | 10-20-10 | NO | les |
| 3. | 2. H464 | 11 Butt.4 | | | 10-20-10 | _NO | ves |
| 3 | | Butt.6 | NONE | N/+ N/+ | 10-20-10 | NO | yes |
| 8. | 3 | | | | | where we are a series of the s | |
| 8. | | | | | | | |
| 8. | 4 | | e <mark>- 1</mark> | | | | |
| 8. | | | | | | | |
| 8. | 5 | | | | ····· | | |
| 8. | | , | | | | | |
| 8. | 6 | | | | | | |
| 8. | | | | | | | |
| NOTE: (A) Location: Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Date: 29 Oct 10 Note: 29 Oct 10 | 7 | | •••••••••••••••••••••••••••••••••••••• | | | | |
| NOTE: (A) Location: Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Date: 29 Oct 10 Note: 29 Oct 10 | | | | | | | |
| NOTE: (A) Location: Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Date: 29 Oct 10 Note: 29 Oct 10 | 8 | within the service we have | | | | | |
| NOTE: (A) Location: Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Date: 29 Oct 10 Note: 29 Oct 10 | | | | | | | |
| NOTE: (A) Location: Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Date: 29 Oct 10 Note: 29 Oct 10 | 9 | | <u></u> | | | | |
| NOTE: (A) Location: Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Date: 29 Oct 10 Note: 29 Oct 10 | | | | | | | |
| Identify Tendon End (Shop or Field) and 1 to 6 - Number of Buttress At End of Tendon (B) If concrete crack width > 0.01°, provide sketch Cognizant Mech/Struct Engineer) Reviewed By:Date: <u>CS</u> OCT / D Nowand HILL | 10 | | مى يەرىپىلىكى يەرىپىيە يەرىپىيە يەرىپىيە يەرىپىيە يەرىپىيە يەرىپىيە تەرىپىيە يەرىپىيە يەرىپىيە يەرىپىيە يەرىپى | and a second second second second second second second second second second second second second second second | and a specific provide the full management | and the second second second second second second second second second second second second second second second | |
| | Iden 1 to 1 | tify Tendon End (Shop or Field) a 6 - Number of Buttress At End of | Tendon | Reviewed By: | A | Date: 20 | <u> Oct ID</u> |
| | (8) | | | . / (, , , , , , , , , , , , , , , , , , | WARP WICC | | |

TMI - Unit 1 Surveillance Procedure

1301-9.1

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Revision No.

RB Structural Integrity Tendon Surveillance

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DATA SHEET 2 As-Found Lift-Off Force Summary Results

| | | As-Fou | nd Lift Off Fo | orce, kip | Predicted | Γ | F > F _{acc} | | F > F _{llim} |
|----------|--------------|----------|----------------|---------------------|--------------------|------------------------|-----------------------|--|-----------------------|
| Group | Tendon ID | Shop End | Field End | Average Force, F | Force, FP - kip | $F_{acc} =$ 0.95 Fp | Circle (Yes) or No | F _{ilim} = 0.90 F _ρ | Circle Yes or No |
| | H 46-39 | 1354.35 | 1391.09 | 1372.72 | 1316 | 1250 | (Yes)/No | 1184 | Ves/No |
| | H46-41 | 1342.87 | · · · · · | 1356.18 | 1314 | 1248 | Yes)/No | 1183 | (Tes) No |
| | 1110_11_ | 121-101 | 10101 | 120 0.18 | | 1=170 | Yes / No | 110.2 | Yes / No |
| | | | | | | 1 | Yes / No | | Yes / No |
| | | | <u> </u> | | | t | Yes / No | | Yes / No |
| Ноор | | - | • | | | <u></u> | Yes / No | | Yes / No |
| | | + | | | | | Yes / No | | Yes / No |
| | | | | | | | Yes / No | | Yes / No |
| | | | | | | 1 | Yes / No | | Yes / No |
| | | | | | | | Yes / No | | Yes / No |
| (| | | | | | | Yes / No | | Yes / No |
| | V-118 | 1365.31 | N/A | 1365.31 | 1240 | 1273 | Yes/No | 1206 | (Yes) No |
| | V-134 | 1341.14 | N/A | 1341.74 | 1332 | 1265 | (Pes)/No | 1199 | Yes/No |
| | | | N/A | | | | Yes / No | | Yes / No |
| Vertical | | | N/A | | | | Yes / No | | Yes / No |
| ventear | | | N/A | | | | Yes / No | | Yes / No |
| | | | N/A | | | | Yes / No | | Yes / No |
| | | | N/A | | | | Yes / No | | Yes / No |
| | | | N/A | | | | Yes / No | | Yes / No |
| | | | | | | | Yes / No | | Yes / No |
| | | | | | | | Yes / No | | Yes / No |
| | | | | | | | Yes / No | | Yes / No |
| Derec | | T | | | | | Yes / No | | Yes / No |
| Dome | | | | | | | Yes / No | | Yes / No |
| | | | | | , | | Yes / No | | Yes / No |
| | | 1 | | | | | Yes / No | | Yes / No |
| | | | 1 | | | | Yes / No | | Yes / No |

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DATA SHEET 6 Retensioning Criteria Confirmation

.

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---------------------------------|---|-----------------------------|------------------------|-------------------|-------------------------|
| TENDON ID | NUMBER OF EFFECTIVE WIRES | 70 % OF ULTIMATE STRENGTH [8.24 X (2)] | PREDICTED BASE FORCE' | AVERAGE [(3)+(4)]+2 | LOCK-OFF FORCE | (4)<(6)<(3) Yes / No |
| DOME | | | | | | |
| SHOP END | | | | | | |
| FIELD END | | | | | | |
| SHOP END | | | | | | |
| FIELD END | | | | | | |
| VERTICAL | | | | | | |
| <u>V-118</u> shop end | 166 | 1367.84 | 1340 | 1353.92 | 1355.88 | Yes |
| SHOP END | | | <u></u> | | | |
| SHOP END | | - <u>1,</u> | | | | |
| HOOP TENDONS | | | | | | |
| H 46-39 SHOP END | 168 | 1384.JZ | 1316 | 13-50.16 | 13/7,99 | Yes |
| FIELD END | 168 | 138432 | 13/6 | 1350.16 | 1337.56 | Yes |
| SHOP END | | | | | | |
| FIELD END | | <u></u> | | | | ····· |
| SHOP END | | 46. | | | | |
| FIELD END | | | | <u></u> | | |
| Cognizant Mech/Struct B Reviewed By: | | A | Howard | Date | : <u>2900</u> | τ <i>Ι</i> Ο |
| Performed By: | A C.J. | by | | Date | 10-28- | -10 |
| | \mathcal{A} | | | | | |

¹ Predicted Base Force from DC-5390-225.01-SE or separate calculation.

DATA SHEET 11 Tendon Surveillance Program

| | Inspection | Period _ | 35 | Kr. AS | | | | | | |
|-----|---------------|-------------|--------------|--|--|--------------|--------------|--|--|--|
| | | | | Gallons Remo | oved* | | Gallons | Replaced* | _ | |
| | Tendon No. | Shop End | Field End | Sum (Q ₁) Shop & Field End | Net Duct Volume, (Q _N), Gallons | Shop End | Field End | Sum (Q ₂) Shop & Field End | 100 x (Q ₂ - Q ₁) / Q _N ,% | Acceptable (Yes or No) |
| 1. | 4 46-39 | | _/ | 2 | 115,26 | 2.65 | 3.09 | 5.74 | 3.24 | Yes |
| 2. | <u>H46-41</u> | .75 | 1.5 | 2.25 | 114.86 | 221 | 2.65 | 4.86 | 2.27 | Yes |
| 3. | <u>V-117</u> | 3 | | 4 | 129.86 | 6,195 | ~/A | 6.195 | 1.69 | <u>Yes</u> |
| 4. | <u>U-118</u> | 5.5 | 6 | 11.5 | 129.6/ | 12.39 | N/A | 12.39 | .68 | Yes |
| 5. | <u>V-119</u> | 2 | <u> </u> | 3 | 129.60 | <u>4.425</u> | 1/1+ | 4.425 | 1.09 | Yes |
| 6. | <u>U-134</u> | _7 | _/ | 8 | 131.62 | 8.85 | ~/A | 8.85 | 100 10-18-10 13462,65 | Yes |
| 7. | | | | | | | | | - | |
| 8. | | | | | | | | | | |
| 9. | | | | | | | <u></u> | | ••••••••••••••••••••••••••••••••••••••• | |
| 10. | | | | | | | · | | - <u></u> | |
| 11. | | | | | | | | | | an an an an an an an an an an an an an a |

Only one end of vertical tendons may be used for removal and replacement of grease.

Cognizant QV Inspector <u>_</u> Date: <u>10-2870</u> __Date: <u>29 Ост10</u> sa Cognizant Meeh/Struct Enginee Review By: Alan

*

| | | | Number |
|---------------------------------------|-----------------------------------|---------------------|----------------------------------|
| | TMI - Unit 1 Surveillance Proc | | 1301-9.1 |
| Title | | | Revision No. |
| RB Structural Integrity Tend | on Surveillance | | 21 |
| | DATA SHEET 1 | 2 | Page 1 of 1 |
| VT -1 | , VT-3, VT-1C, and VT-3C Exa | miner Qualification | |
| Name of Examiner | Employer | Method | Level |
| W. RANCE ROBBINS TIMOTHY C. GIBSON | PSC | VT=1, VT=3, 1 | NFIC, VT-3C II |
| TIMOTHY C. GIRSON | PSC | VT-1, VT-3, VT. | 1FIC, VT-3C II - 1C, VT-3C 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.

IL.C. UNARD **Responsible Engineer:** Name 30 SEP / Expiration 22265 Registration C., State License No. Date 20 OCT 10 Signature Date 10/20/10 **Exelon NDE Services Concurrence** Date <u>10-6-1</u>0 **ANII** Concurrence

[

ENCLOSURE 3

Data Sheet 2

Laboratory Analysis of Bulk Filler Grease

Vertical Tendons

INSPECTION PERIOD 2010 Augmented exam

| SAMPLE IDENTIFICATION | TENDON END Bottom (F: cld | <u>CHLORIDES⁽¹⁾ (PPM)</u> くの、らの | <u>NITRATES⁽¹⁾ (PPM)</u> ∠0,50 | <u>SULFIDES⁽¹⁾ (PPM)</u> کر ۲۰۵۰ م | <u>WATER/DRY</u> <u>WEIGHT (2)</u> <u>%</u> 4 0.10 | RESERVE ⁽¹⁾ ALKALINITY (BASE NUMBER) 65.1 |
|--------------------------|---------------------------------|---|--|--|--|---|
| 2. VII | Top/shop | 20.50 | <0,50 | ٢0,500 | 0,19 | 69.1 |
| 3. V134 | Bottom/Field | 20.50 | 40,50 | 40,500 | 20,10 | 63.3 |
| 4. V134 | Top/shop | 40.50 | 20,50 | 20,500 | 20,10 | 70.8 |
| 5 | | | | | | |
| | | | | | | |

- (1) ACCEPTANCE CRITERION IS GIVEN ON PAGE 2 OF ENCLOSURE 3.
- (2) ACCEPTANCE CRITERION IS 10% MAXIMUM BY WEIGHT. TENDON END: TOP, BOTTOM

| LABORATORY TECHNICIAN | |
|-----------------------|-----------------------|
| PREPEARED BY: | DATE: |
| LABORATORY SUPERVISOR | DATE: Grease Analysis |

| COGNIZANT MECH/STRUCT ENGINEER | |
|--------------------------------|--------------|
| APPROVED BY: | DATE: 2/9/11 |

ENCLOSURE 3

Data Sheet 3

Laboratory Analysis of Bulk Filler Grease

Hoop Tendons

INSPECTION PERIOD 2010 Augusted exam

| SAMPLE IDENTIFICATION | TENDON END | CHLORIDES ⁽¹⁾ (PPM) | NITRATES ⁽¹⁾ (PPM) | SULFIDES ⁽¹⁾ (PPM) | <u>WATER/DRY</u> <u>WEIGHT (2)</u> <u>%</u> | RESERVE ⁽¹⁾ ALKALINITY (BASE NUMBER) |
|--------------------------|----------------|-----------------------------------|--|----------------------------------|---|---|
| 1. <u>H46-41</u> | BAH 6/ shop | 20,50 | 20.50 | 20.500 | 20.10 | 74.0 |
| 2.446-41 | B.H. 4/ F. eld | 20,50 | < 0.50 | 20,500 | 20.10 | 71.3 |
| 3. H46-39 | Bitt 6/ shop | 20,50 | 20.50 | 20,500 | K0,10 | 73.6 |
| 4. H46-39 | BHYField | 20.50 | 20.50 | 40.500 | <0.10 | 71.2 |
| 5 | | | <u></u> | | ······ | - |
| 6 | | | and the second sec | | | |

- (1) ACCEPTANCE CRITERION IS GIVEN ON PAGE 2 OF ENCLOSURE 3.
- (2) ACCEPTANCE CRITERION IS 10% MAXIMUM BY WEIGHT. TENDON END: BUTTRESS NUMBER

| LABORATORY TECHNICIAN PREPEARED BY: | DATE: |
|--|---|
| Sحر LABORATORY SUPERVISOR VERIFIED BY: | Suburban Laboratories, Inc DATE: Grease Analysis |

| COGNIZANT ME | CH/STRUCT ENGINEER | - · · / |
|--------------|--------------------|--------------|
| APPROVED BY: | <u>~</u> | DATE: 2/9/11 |

SUBURBAN LABORATORIES, Inc.



4140 Litt Drive Hillside, Illinois 60162 Tel. (708) 544-3260. Toll Free (800) 783-LABS Fax (708-544-8587 www.suburbanlabs.com

Workorder: 1011234

January 20, 2011

Gerald Bussone Precision Surveillance Corp. 3468 Watling Street East Chicago, IN 46312

TEL: (219) 975-5826 FAX: (219) 975-5867 RE: 1094

Dear Gerald Bussone:

Suburban Laboratories, Inc. received 8 sample(s) on 11/04/10 for the analyses presented in the following report.

. . .

All data for the associated quality control (QC) met EPA, method, or internal laboratory specifications except where noted in the case narrative. If you are comparing these results to external QC specifications or compliance limits and have any questions, please contact us.

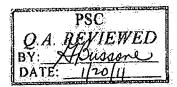
This final report of laboratory analysis consists of this cover letter, case narrative, analytical report, dates report, and any accompanying documentation on, but not limited to, chain of custody records, raw data, and letters of explanation or reliance. This report may not be reproduced, except in full, without the prior written approval of Suburban Laboratories, Inc.

If you have any questions regarding these test results, please call me at (708) 544-3260.

Sincerely,

Milina Amador.

Melissa Amador Project Manager



Illinois Department of Public Health Accredited # 17585



Illinois Environmental Protection Agency Accredited #100225

Topical Report 204 Revion 0 Attachment 8.7 Page 164 of 523



4140 Litt Drive, Hillside, IL 60162: (708) 544-3260

Case Narrative

Client: Precision Surveillance Corp. Project: 1094 WorkOrder: 1011234

Temperature of samples upon receipt at SLI: 18 C

General Comments:

- All results reported in wet weight unless otherwise indicated. (dry = Dry Weight)
- Sample results relate only to the analytes of interest tested and to sample as received by the laboratory.
- Environmental compliance sample results meet the requirements of 35 IAC Part 186 unless otherwise indicated.
- Waste water analysis follows the rules set forth in 40 CFR part 136 except where otherwise noted.
- Accreditation by the State of Illinois is not an endorsement or a guarantee of the validity of data generated.

- For more information about the laboratories' scope of accreditation, please contact us at (708) 544-3260 or the Agency at (217) 782-6455.

Abbreviations:

- Reporting Limit: The concentration at which an analyte can be routinely detected on a day to day basis, and which also meets regulatory and client needs.

- Quantitation Limit: The lowest concentration at which results can be accurately quantitated.

- J: The analyte was positively identified above our Method Detection Limit and is considered detectable and usable; however, the associated numerical value is the approximate concentration of the analyte in the sample.

- ATC: Automatic Temperature Correction. - TNTC: Too Numerous To Count

- In Laboratory: EPA recommends this analyte be analyzed "immediately" (e.g., tests that should be performed in the field within 15 minutes of collection). Analytes with "immediate" hold times are analyzed as soon as possible upon receipt by the laboratory.

- TIC: Tentatively Identified Compound (GCMS library search identification, concentration estimated to nearest internal standard).

Method References:

For a complete list of method references please contact us.

- E: USEPA Reference methods

- SW: USEPA, Test Methods for Evaluating Solid Waste (SW-846)

- M: Standard Methods for the Examination of Water and Wastewater

- USP: Latest version of United States Pharmacopeia

Workorder Specific Comments:

This report supersedes the report dated 11/18/10.

PSC Q.A. REVIEWED BY: HBussore DATE: 1/20/14

STMCL: Choride - Samples 1011234-001A through 1011234-008A: The volume of titrant was was the same for the blank and the sample. Therefore the samples were indistinguishable from the blank which is known to contain

12-1

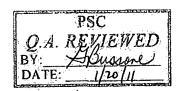
PO #: QC Level: LEVEL 1 Chain of Custody #:

Date: January 20, 2011

| Client: Precision Surveillance Corp. | |
|---|----------|
| Project: 1094 | |
| WorkOrder: 1011234 | |
| Temperature of samples upon receipt at SL | .I: 18 C |

Date: January 20, 2014 PO #: QC Level: LEVEL I Chain of Custody #:

no chloride ion.



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4140 Litt Drive, Hillside, IL 60162 (708) 544-3260

Client ID: Precision Surveillance Corp.

Project Name: 1094

Client Sample ID: H46-41 BUTT 6 S/E

Lab ID: 1011234-001

Date Received: 11/04/2010 10:15 AM

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|--|------|
| | |
| | |

Laboratory Results

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Report Date: January 20, 2011 Lab Order: 1011234

Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM

| | | Report | | | Dilution | l | |
|-------------------------------|---------|--------|-------------|---------------|------------|---------------------|-----------------|
| Parameter | Result | Linit | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-F | ev 2004 | | Anelyst: Ib | |
| Chloride | < 0.50 | 0.50 | C., | ppm | 1 : | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | ASTM-D95-Re | ¥- | | Analyst: II | |
| Moisture Content | < 0.10 | 0.10 | ć | wt% | 4 | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | Method | ASTM-D992-R | ev - | | Analysi: Ib | |
| Nitrate | < 0.50 | 0.50 | C | ppm | 1 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | Method | ASTM-0974 M | odified-Rev - | - | Analyst: Ib | |
| Base Number | 74.0 | 0.500 | Ċ | mg KOH/g | 1 | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | | Method | APHA-M427-R | ev - | | Analyst: Ib | |
| Sulfide | < 0.500 | 0.500 | C | ópm | Ť | 11/05/2010 12:24 PM | R7047 |

Client Sample ID: H46-39 BUTT 6 S/E

Lab ID: 1011234-002

Date Received: 11/04/2010 10:15 AM

Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM

| | | Report | | | Dilution | í | |
|-------------------------------|---------|--------|---------------|----------|----------|---------------------|----------|
| Parameter | Result | Limit | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-F | Rev 2004 | | Analyst: Ib | |
| Chloride | < 0.50 | 0.50 | с | ppm | 1 | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | : ASTM-D95-Re | ev - | | Analyst: II | |
| Moisture Content | < 0.10 | 0.10 | c | wt% | ť | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | | ASTM-D992-F | lev - | | Analyst: Ib | |
| Nitrate | < 0.50 | 0.50 | c | ppm | 1 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | | : ASTM-D974 N | | | Analyst: Ib | |
| Base Number | 73.6 | 0.500 | C | mg KOH/g | Í. | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | | Method | APHA-M427-R | | | Analyst: Ib | |
| Sulfide | < 0.500 | 0.500 | C | ppm; | 1: | 11/05/2010 12:24 PM | R7047 |

PSC O.A. RBY: DATE

Qualifiers: */x Value exceeds Maximum Contaminant Level

- ΰĊ. Analyte not in SLI scope of accreditation
- Refer to case narrative page for specific comments G
- Analyte detected below quantitation limit (QL) Ĵ.
- ND Not Detected at the Reporting Limit

- **B**: Analyte detected in the associated Method Blank
- Estimated, detected above quantilation range E
- Holding times for preparation or analysis exceeded H
- N: Tentatively identified compounds.
- R RPD outside accepted recovery limits.

4140 Litt Drive, Hillside, IL 60162 (708) 544-3260.

Client ID: Precision Surveillance Corp.

Project Name: 1094

Client Sample ID: V118 BOTTOM F/E

Lab ID: 1011234-003

Date Received: 11/04/2010 10:15 AM

Report Date: January 20, 2011 Lab Order: 1011234

Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM .

| | | Report | | | Dilution | • | |
|-------------------------------|---------|---------|-------------|----------|----------|---------------------|-----------------|
| Parameter | Result | Limit | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-F | Rev 2004 | | Analyst: Ib | |
| Chloride | < 0.50 | 0.50 | ć | ppm | ·1 | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | ASTM-D95-Re | IV | | Analysi: II | • • • |
| Moisture Content | < 0.10 | 0.10 | Ċ | wt% | -1 | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | Method | ASTM-D992-F | lev - | | Analyst: Ib | |
| Nitrate | < 0.50 | 0.50 | c | ppm | 1 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | Method | ASTM-D974 N | | , · | Analyst: Ib | wa a |
| Base Number | 65.1 | 0.500 | C, | mg KOH/g | 1 | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | | Method: | APHA-M427-R | lev - | | Analysi: Ib | |
| Sulfide. | < 0.500 | 0.500 | Ċ | ppni | 1 | 11/05/2010 12:24 PM | R7047 |

Client Sample ID: V134 BOTTOM F/E

Lab ID: 1011234-004

Date Received: 11/04/2010 10:15 AM

Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM

| | | | | | ••••••••••••••••••••••••••••••••••••••• | | |
|-------------------------------|---------|-----------------|-------------|----------------|---|---------------------|----------|
| Parameter | Result | Report Limit | Qual. | Units | Dilution Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-F | Rev 2004/2 | | Analyst: Ib | |
| Chloride | < 0.50 | 0.50 | C. | ppm | ή | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | ASTM-D95-Re | | | Analyst: il | |
| Moisture Content | < 0.10 | 0,10 | Ċ. | • w1% | 1 | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | · · · · · | ASTM-D992-R | ev - | | Analyst; Ib | |
| Nitrate | < 0.50 | 0.50 | C | ppm | 4 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | Method | ASTM-D974 M | lodified-Rev - | | Anatyst: Ib | |
| Base Number | 63.3 | 0.500 | ç | mg KOH/g | i | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | | Method | APHA-M427-R | ev - | | Analyst: Ib | |
| Sulfide | < 0.500 | 0.500 | C | ppm | 1 | 11/05/2010 12:24 PM | R7047 |

PSC Q.A. R BΥ DATE

Qualifiers: B Analyte detected in the associated Method Blank :*/x Value exceeds Maximum Contaminant Level ĉ Analyte not in SLI scope of accreditation E Estimated, detected above quantitation range Ġ H Refer to case narrative page for specific comments Holding times for preparation or analysis exceeded Ŧ N Tentatively identified compounds Analyte detected below quantitation limit (QL) ŃD Not Detected at the Reporting Limit:

R RPD outside accepted recovery limits

4140 Litt Drive, Hillside, IL 60162 (708) 544-3260

Client ID: Precision Surveillance Corp.

Project Name: 1094

Client Sample ID: V134 TOP S/E

Lab ID: 1011234-005

Date Received: 11/04/2010 10:15 AM

Report Date: January 20, 2011 Lab Order: 1011234

Laboratory Results

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Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM

| | | Report | | | Dilution | l | |
|-------------------------------|---------|--------|-------------|--------------|----------|---------------------|----------|
| Parameter | Result | Limit | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-R | ev 2004 | | Analysi: Ib | |
| Chloride | < 0.50 | 0.50 | C | ppm | 1 | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | ASTM-D95-Re | <i>i</i> - | | Analyst: II | • |
| Moisture Content | < 0.10 | 0.10 | C | wt% | đ | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | Method | ASTM-D992-R | - VC | | Analyst: Ib | |
| Nitrate | < 0.50 | 0.50 | c | ppm | 1 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | Method | ASTM-D974 M | dified-Rev - | | Analysi: Ib | |
| Base Number | 70.8 | 0.500 | С | mg KOH/g | 1 | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | | Method | APHA-M427-R | | ·, | Analyst: Ib | 1 128 |
| Sulfide | < 0.500 | 0.500 | C | cpm | ť | 11/05/2010 12:24 PM | R7047 |

Client Sample ID: H46-41 BUTT4 FIELD

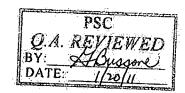
Lab ID: 1011234-006

Date Received: 11/04/2010 10:15 AM

Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM

| | | Report | | | Dilution | I | |
|-------------------------------|---------|--------|---------------|----------|-----------|---------------------|-----------|
| Parameter | Result | Limit | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-F | Rev 2004 | · · · · · | Analyst: Ib | |
| Chloride | < 0.50 | 0.50 | Ć | ppm | 1 | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | ASTM-D95-Re | 9V - | | Analysi: Il | |
| Moisture Content | < 0.10 | 0.10 | ç | wt% | 1 | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | Method | ASTM-D992-F | | | Analyst: Ib | |
| Nitrate | < 0.50 | 0.50 | C, | ppm | Ť | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | Method | : ASTM-D974 N | | | Analyst: Ib | * . ý * . |
| Base Number | 71.3 | 0.500 | · C; | mg KOH/g | 1 | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | · | Method | : APHA-M427-F | | | Analyst: Ib | |
| Sulfide | < 0.500 | 0.500 | c | ppm | 1 | 11/05/2010 12:24 PM | R7047 |



Qualifiers: */x Value exceeds Maximum Contaminant Level B Analyte detected in the associated Method Blank È Analyte not in SLI scope of accreditation: Estimated, detected above quantitation range ć G

- Refer to case narrative page for specific comments
- J Analyte detected below quantitation limit (QL)
- ND Not Detected at the Reporting Limit

- Ĥ Holding times for preparation or analysis exceeded
- Ņ Tentatively identified compounds
- Ŕ RPD outside accepted recovery limits

4140 Lin Drive, Hillside, IL 60162 (708) 544-3260

Client ID: Precision Surveillance Corp.

Project Name: 1094

Client Sample ID: H46-39 BUTT 4 FIELD

Lab ID: 1011234-007

-007 Date Received: 11/04/2010 10:15 AM

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Report Date: January 20, 2011 Lab Order: 1011234

Matrix: GREASE

Collection Date: 10/20/2010 12:00 AM

| | | Report | | 17 | Dilution | I | |
|-------------------------------|---------|--------|-------------|----------|----------|---------------------|----------|
| Parameter | Result | Linut | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method | ASTM-D512-R | ev 2004 | <u> </u> | Analyst: Ib | · ··· |
| Chloride | < 0.50 | 0.50 | C | ppm | 1 | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method | ASTM-D95 Re | | | Analysi: II | |
| Moisture Content | < 0.10 | 0.10 | C. | w1% | Ť | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | | ASTM-D992-R | ev - | | Analysi: Ib | |
| Nitrate | < 0.50 | 0.50 | c | ppm | 1 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | • • | Method | ASTM-D974 M | 2 | - | Analyst: Ib | |
| Base Number | 71.2 | 0.500 | c | mg KOH/g | 1 | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | , , | Method | APHA-M427-R | | ۰. | Analyst: Ib | |
| Súlfide | < 0.500 | 0.500 | с | ppm | 1 | 11/05/2010 12:24 PM | R7047 |

Client Sample ID: V118 TOP S/E

Lab ID: 1011234-008

008 Date Received: 11/04/2010 10:15 AM

Matrix: GREASE

Collection Date: 10/19/2010 12:00 AM

| | | Report | | | Dilution | l | |
|-------------------------------|---------|----------------------------|-------------|----------------|---------------|---------------------|----------|
| Parameter | Result | Limit | Qual. | Units | Factor | Date Analyzed | Batch ID |
| CHLORIDE BY ASTM | | Method: ASTM-D512-Rev 2004 | | | Analyst: Ib | | |
| Chloride. | < 0.50 | 0.50 | .C . | ppm. | ° 1 °, | 11/05/2010 12:09 PM | R7045 |
| MOISTURE BY ASTM | | Method: ASTM-D95-Rev - | | | ~* | Analyst: II | |
| Moisture Content | 0.19 | 0.10 | C. | wt% | 1 | 11/05/2010 9:55 AM | R7060 |
| NITRATE BY ASTM | | Method | ASTM-D992-F | lëv - | | Analyst: Ib | |
| Nitrate | < 0.50 | 0.50 | C, | ppm | 1 | 11/06/2010 3:08 PM | R7079 |
| NEUTRALIZATION NUMBER BY ASTM | | Method | ASTM-D974 N | fodified-Rev - | | Analyst: Ib | |
| Base Number | 68.1 | 0.500 | C | mg KOH/g | ĺ | 11/07/2010 12:01 PM | R7083 |
| SULFIDE BY APHA | · | | APHA-M427-F | Rev - | | Analyst: Ib | |
| Sulfide | < 0.500 | 0.500 | С | ppm | Ξ. | 11/05/2010 12:24 PM | R7047 |

PSC DATE

*/x Value exceeds Maximum Contaminant Level Qualifiers: Ĩ Analyte detected in the associated Method Blank Analyte not in SLI scope of accreditation Ē Estimated, detected above quantitation range ,c \mathbf{G} Refer to case narrative page for specific comments. Н Holding times for preparation or analysis exceeded J Analyte detected below quantitation limit (QL) N Tentatively identified compounds R **RPD** outside accepted recovery limits ND Not Detected at the Reporting Limit,

Precision Surveillance Corporation

3468 Watling Street East Chicago, IN 4632 Email: info@psctendon.com Phone: (219) 397-5826 Fax: (219) 397-5867 http://www.psctendon.com



November 2, 2010

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Suburban Laboratories, Inc. 4140 Litt Drive Hillside, IL. 60162

501 WO# 1011234

Attention Melissa Amador,

Please test the following eight (8) grease samples per PSC-P.O. # 1094.

| H46-41 | BUTT 6 | S/E - ODIA |
|--------|--------|---------------|
| H46-41 | BUTT 4 | Field - COLOA |
| H46-39 | BUTT 6 | S/E - 002A |
| H46-39 | BUTT 4 | Field - 007A |
| V118 | Тор | S/E - 008A |
| V118 | Bottom | F/E-003A |
| V134 | Тор | S/E-005A |
| V134 | Bottom | F/E - 004A |

We would like results 10-15 days after receipt of samples. Any questions or problems please contact me. The above samples are being shipped to you via UPS Ground on 11/3/10.

Thank you,

Gerald Bussone PSC/QA

> Topical Report 204 Review 0 Attachment 8.7 Page 171 of 523

| 3466 W/ EAST C USA | ISION SUI ATLING ROAD HICAGO, IN 46 | RVEILLANCE | CORPORATI | ON O | URCH RDER hase Order No.: 109 lissued: 11/2 | | |
|--------------------------|--|---|--|--|---|----------------|--|
| | 19-397-6826 19-397-5807 | | | AND TO | 723313355123475-353 | | |
| SUBUR 4140 Li | BAN LABORAT IT DRIVE IE, IL 80182-11 | | | PRECISION SI 3468 WATLING | URVEILLANCE COR 3 ROAD 10, IN 40312-1709 | PORATION. | |
| 12/2 | Thruss 10 | BEST WAY | | ALUIL NO. | A MARKAN AND AND AND AND AND AND AND AND AND A | ame 30 Days | |
| | Test greases 07/31/09. Ter water content results to PSO Assurance PI Suburban sha conformance A member of Including auth to the Suburb activities. Sub or nonconform Department pr acceptability. | samples (8) samples of an plan (8) samples of the for water soluble cht and neutralization num QA Department. All an, Rev. 9, dated 9/1/0 il submit a laboratory with the requirements Suburban's QA Depart orized Clients and Con an facility for the purport urban shall report any ing conditions from the for to completion of the $11^2 234^2$ - | orides, uitrales, and mber as per proced provisions of the Su 7 apply to the cont report indicating the of this Purchase Or timent shall authent tractors shall have uses of record review defects e Purchase Order to the Purchase Order to the Purchase Order to | I sufficies, lure sections 6 and 8. Iburban Quality racted services herein results of the tests w rder. Icate the laboratory re right-of-access w, and/or audit or surv squirements to the PS | 0, dated Provide n. réré in isults: PSC, veillance | | |
| | | M 4 /1 | 0' 1015 pm 18°C | n Mg | IOTAL | | |
| Authorized S | ignature | But cu | 4 | | PSC Q.A. REVIE BY: House DATE: 112-11 | WED | |

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ENCLOSURE 1 Data Sheet Stressing Ram Calibration

RAM DESCRIPTION PINE 850Ton \$6001

LOAD CELL CONSTANT 10.0031

| RAM TARGET LOAD (KIPS) | CALCULATED TARGET PRESS. (PSIG) | AT 25% = LOADI | | AT 50% = | IN IG #2 | AT 75% = _ LOADIN | | AVERAGE LOAD (KIPS) | | |
|---------------------------------|---|-------------------|--------------------|--------------|-------------|----------------------|--|---------------------------|-----------------------------------|-----------|
| . , | | LOAD CELL | (KIPS)* | LOAD CELL | (KIPS)* | LOAD CELL | (KIPS)* | · · · | _ } | |
| 150K | | | | | | | | | | |
| <u>300K</u> | | | | | | | | | | Dec |
| <u>500K</u> | | | | | | | | | / Jee | FJC |
| <u>600K</u> | | | | | | | | | See Jack (a) | 1 1 |
| <u>700K</u> | | | | | | | | |) on a la | i bration |
| <u>800K</u> | ····· | | | | | | | | | Records |
| <u>900K</u> | | | · | | | | | | \backslash | |
| <u>1000K</u> | | | | | | | <u> </u> | | | |
| <u>1100K</u> | | | | | | | | | \ | |
| <u>1200K</u> | | | | | | | | | 1 | |
| <u>1300K</u> | | | | | <u></u> | | | | | |
| <u>1400K</u> | | | <u> </u> | | | | | | / | |
| <u>1500K</u> | | | | | | | | | | |
| <u>1600K</u> | | | | | <u> </u> | | | | | |
| | | | | | <u> </u> | | | | | |
| USING THE I | ATION CONSTANT METHOD OF LEAS RTIFICATIONS OF 1 | SQUARES. AF | REAIN ² | INTERNAL RES | STANCE(K) | | | | – AND PRESSURI LOAD CELL CO | |
| APPROVED | BY COGNIZANT ME | | | \leq | | | ······································ | DATE 2 10 | 1/11 | |

| PREPARED BY LABORATORY TECHNICIAN:_ | | DATE |
|-------------------------------------|----------------------------------|------|
| VERIFIED BY LABORATORY SUPERVISOR: | See PSC Jack Calibration Records | DATE |

ENCLOSURE 1 Data Sheet Stressing Ram Calibration

| RAM DESCRIPTION PINE | 850 Ton *6002 | | | |
|---|--|------------------------|-------------------------|--------------------------------|
| LOAD CELL CONSTANT | 0.0031 | | | |
| RAM CALCULATED TARGET TARGET | | | | AVERAGE |
| LOAD PRESS. | AT 25% = IN | AT 50% = IN | AT 75% = IN | LOAD |
| (KIPS) (PSIG) | LOADING #1 | LOADING #2 | LOADING #3 | (KIPS) |
| <u>بر میں اور اور اور اور اور اور اور اور اور اور</u> | LOAD CELL (KIPS)* | LOAD CELL (KIPS)* | LOAD CELL (KIPS)* | |
| <u>150K</u> | | | | |
| <u>300K</u> | | | | |
| <u>500K</u> | | | | |
| <u>600K</u> | | | | |
| <u>700K</u> | | | | Ser PSC |
| <u>800K</u> | | - <u></u> | <u> </u> | Javk Calibration |
| <u>900K</u> | | | | Jank Calibration |
| 1000K | | | | Reunds |
| 1100K | | | | (|
| 1200K | | | | |
| <u>1300K</u> | | | | |
| 1400K | | | | |
| <u>1500K</u> | | | | |
| <u>1600K</u> | | | | |
| | | | | |
| | | | | / |
| RAM CALIBRATION CONSTAN | ITS DETERMINED FROM SLOP | E AND INTERCEPT OF STR | AIGHT LINE FITTED TO AV | ERAGE LOAD AND PRESSURE DATA |
| | ST SQUARES. AREAIN ² INIST TRACEABILITY FOR TES | | KIP *** | LOAD CELL X LOAD CELL CONSTANT |
| | | a | | 0 le 1. |
| APPROVED BY COGNIZANT M | AECH/STRUCT ENGINEER: | | | DATE 2/9/11 |
| PREPARED BY LABORATORY | | | | DATE |
| VERIFIED BY LABORATORY S | SUPERVISOR: 54 PSL | - Jack Calibration | Records | DATE |
| | | | | |

ENCLOSURE 1 Data Sheet Stressing Ram Calibration

RAM DESCRIPTION MAGNUS 1000Ton \$9400

LOAD CELL CONSTANT 10.0031

| RAM TARGET LOAD | CALCULATED TARGET PRESS. | AT 25% = | IN | AT 50% = | IN | AT 75% = | IN | AVERAGE LOAD | | |
|-----------------------|---------------------------------------|-----------|----------|---------------|----------|-----------|---------|-----------------|--------------------------------------|----|
| (KIPS) | (PSIG) | LOADI | | LOADIN | | LOADING | | (KIPS) | | |
| | | LOAD CELL | (KIPS)* | LOAD CELL | (KIPS)* | LOAD CELL | (KIPS)* | | <u>\</u> | |
| 150K | | | | | | | | | \backslash | |
| <u>300K</u> | | | <u> </u> | | | | | | | |
| <u>500K</u> | | | <u> </u> | <u> </u> | | | | | | |
| <u>600K</u> | <u></u> | | | | <u> </u> | | | | | |
| <u>700K</u> | <u></u> | | <u> </u> | | | | | | See PSC Jank Calibrat: Recover | |
| <u>800K</u> | NAME OF THE OWNER OF THE OWNER OF THE | | | | | | | | See ISC | |
| <u>900K</u> | | | | | | | | | Jack (attach | |
| 1000K | | | | | | | | | children . | 92 |
| 1100K | | | | | | | | | Kevoris | |
| 1200K | | | | | | | | | \backslash | |
| 1300K | | | | | | | | | | |
| 1400K | | | | | | | | | | |
| 1500K | | | | | | | | | | |
| 1600K | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | AND PRESSURE DATA | _ |
| | NETHOD OF LEAST RTIFICATIONS OF N | | | INTERNAL RESI | | KIP | * | LOAD CELL X | LOAD CELL CONSTANT | |

| | DATE 219/1 |
|---|------------|
| PREPARED BY LABORATORY TECHNICIAN: | DATE |
| VERIFIED BY LABORATORY SUPERVISOR: See PSC Javk Calibration Reverds | DATE |

| PSC | HYDRAULIC JA Jack Calibi | CK CALIBRATI(ration Record | DOCUMENT NO: DOCUMENT TYPE: ENO REVISION # 0 SAFETY RELATED X' NON-SAFETY RELATED PAGE 1 OF 3 |
|---------------------|--|--|--|
| | COMPUTED BY: DJM | DATE: 09/29/10 RE | VIEWED BY: BAG DATE: 09/29/10 |
| Project: POST W | OLF CREEK | <u></u> | Contract No: N1054 |
| | PINE | Size: 850 Tons | Register No: 6001 |
| Theoretical Ram A | irea: <u>190.45</u> šą. iń. | and a second distribution of the second distribu | Max Pressure: 8500 psi |
| Calibrating Device | Used: MOREHOUSE R | egister No: 61195 | Constant: 10.0031 |
| Calibrating Gauge | Used: HEISE R | egister No: 44084 | Due Date: 07/28/12 |
| Raw Data By: D | Environment of the state of the | CONTRACTOR AND A DECIMAL AND A | N/A |
| Mean Ram Area: | 191:181, sq. in. K= -8:35 | 2 kips Agency: I | |
| | AVID MALDONADO | QC Check | |
| Title: FIELD ENG | INEER Date: 0 | 9/29/10 Title: OA | Manager Date: 9/29/10 |
| Tarat Dara | | | |
| Target Pressure (I | | Load Cell Readout | |
| 1000 | 1003 | 18720.00 | RUN: <u>1</u> POSITION: <u>1.5</u> " |
| 2000 | 2004 | 37610.00 | |
| 3000 | <u> </u> | 56610.00 | |
| <u>4000</u> 5000 | 5000 | 75710.00 | |
| 6000 | 6004 | 94745.00 114015.00 | |
| 7000 | 7002 | 133155.00 | |
| 8000 | 8009 | 152340.00 | - |
| 8500 | 8512 | 161960.00 | - |
| .0300 | 05,12 | 101900.00 | - |
| 1000 | 1000 | 18415.00 | RUN: 2 POSITION: 3" |
| 2000 | 2001 | 37130.00 | |
| 3000 | 3004 | 56185.00 | -1 |
| 4000 | 4004 | 75485.00 | |
| 5000 | 5006 | 94615.00 | - |
| 6000 | 6000 | 113645.00 | |
| 7000 | 7006 | 132825.00 | |
| 8000 | 8003 | 151825.00 | |
| 8500 | 8504 | 161410.00 | |
| · | | | |
| 1000 | 1003 | 18745.00 | RUN: 3 POSITION: 4.5" |
| 2000 | 2004 | 37655.00 | I |
| 3000 | 3008 | 56770.00 | l [|
| 4000 | 4002 | 75750.00 | _ |
| 5000 | 5003 | 94935.00 | _ |
| 6000 | 6004 | 114130.00 | I |
| 7000 | 7001 | 133120.00 | I |
| 8000 | 8000 | 152215.00 | _i |
| 8500 | 8502 | 161835.00 | |
| <u></u> | | | Topical Report 204 Review Attachment 8.7 Page 176 d |

| | | | | DOCUMENT NO | : | | |
|---|---|---|--|--|---------|---------|--|
| | بالمحاطر فبعرض والمحاج | INTO A LIT TO PA OF CALLED DATES | | | | | |
| | HYDRAULIC J | ACK CALIBRA' | ΓΙΟΝ | REVISION # | | 0., | |
| XOX) | Linear Dat | ression Analysis | | SAFETY RELAT | ED | X | |
| | Linear Reg | sicssion Analysis | | NON-SAFETY RI | | | |
| Receipton Surpediance | | | | PAGE | 2 OF | 3 | |
| Corporation | COMPUTED BY: DJM | DATE: 09/29/10 | DEVICINED DV | BAG | | 9/29/10 | |
| | COMPUTED BY: DIM | DATE: 09/29/10 | REVIEWED BY: | BÂŬ | DATE: 0 | 9129110 | |
| Project: POST | WOLF CREEK | | Contrac | t No: N1054 | | | |
| Jack Description: | PINE | Size: 850 Tons | Registe | · · · · · · · · · · · · · · · · · · · | | | |
| Theoretical Ram A | rea: 190.45 sq. in. | | Max Pre | ssure: 8500 | psi | | |
| Calibrating Device | Used: MOREHOUSE | Register No: 61195 | Constar | nt: 10.0031 | | | |
| Calibrating Gauge | Used: HEISE | Register No: 44084 | Due Dal | te: 07/28/12 | 2 | | |
| Ē | | | | E | - | | |
| | Actual Gauge Reading (psi) | Load Cell Readout | | Force (kips) | | | |
| | 1003 | 18720.00 | | .258 * | | | |
| <u> </u> | 2004 | 37610.00 | | .217 | | | |
| | 4005 | 56610.00 75710.00 | | .335 | | | |
| ┣- | .5000 | 94745.00 | | .335 | | | |
| Į- | 6004 | 114015.00 | | . <u>744.</u>).503 | | | |
| <u>⊢</u> | 7002 | 133155.00 | | .963 | | | |
| -1 | 8009 | 152340.00 | | 1.872 | | | |
| - F- | 8512 | 161960.00 | | 0.102 | | | |
| F | 1000 | 18415.00 | | 207 | | | |
| F | 2001 | 37130,00 | | .415 | | | |
| 2, | 3004 | 56185.00 | 562 | | | | |
| F | 4004 | 75485.00 | | .084 | | | |
| F | 5006 | 94615.00 | | 443 | | | |
| | 6000 | 113645.00 | 1136 | 5.802 | | | |
| C | 7006 | 132825.00 | | .662 | | | |
| Ĺ | 8003 | 151825.00 | 1518 | | | | |
| <u>:</u> | 8504 | 161410.00 | 1614 | | | | |
| Ĺ | 1003 | 18745.00 | 187. | | | | |
| <u>~</u> | 2004 | 37655.00 | 376. | | | | |
| ļ_ | 3008 | 56770.00 | 567. | | | | |
| <u> </u> | 4002 | 75750.00 | 757. | | | | |
| | 5003 | 94935.00 | 949. | | | | |
| | <u> </u> | 114130.00 | 1141 | and the second states and the second states of | | | |
| ⊢ | 8000 | 133120.00 152215.00 | | .613 | | | |
| | 8502 | 161835.00 | 1522 | | | | |
| H | 0002 | 101030200 | 1010 | , WE. | | | |
| <u></u> | ************************************** | <u> </u> | | ····· | | | |
| · · · · · · · · · · · · · · · · · · · | | · · · · · · · · · · · · · · · · · · · | ···· | | | | |
| L | * Indicates these reading | have been omitted from the | efinal computations | ······ | | | |
| | | a a construction de la construction | | | | | |
| | o grant in the later of the | | ionnai computations | | | | |
| Er | rors In Jack Calibration | | • | | | | |
| Eŕ | Error In Standard | | ····· | 승규는 친구 가지 않는 것 같아요. | | | |
| <u>Er</u> | Error In Standard | | ······ | 0.0000 ksi | | | |
| | Error In Standard | | ······ | 0.0000 ksi | | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration | | ······································ | 0.0000 ksi 0.0000 ksi | | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master | | ······································ | 0.0000 ksi 0.0000 ksi 0.0000 ksi | | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge | | ······································ | 0.0000 ksi 0.0000 ksi 0.0000 ksi 0.0050 ksi | | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master | 27.4 | ······································ | 0:0000 ksi 0:0000 ksi 0:0000 ksi 0:0050 ksi 0:0100 ksi | | | |
| _ <u></u> | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge. Accuracy of Master Accuracy of Field Gauge. | 27.4 | ······································ | 0:0000 ksi 0:0000 ksi 0:0000 ksi 0:0050 ksi 0:0100 ksi | | | |
| _ <u></u> | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge | | | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0275 ksi | | | |
| _ <u></u> | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge rors In Field Use of Gauge Interpolation Error | | | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0100 ksi 0.0275 ksi 0.0050 ksi | | | |
| <u>. En</u> | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge. Accuracy of Master Accuracy of Field Gauge Interpolation Error Accuracy Error | | | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0275 ksi 0.0275 ksi | | | |
| <u>. En</u> | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge rors In Field Use of Gauge Interpolation Error | | | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0275 ksi 0.0275 ksi | | | |
| En En Ma | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge Interpolation Error Accuracy Error Accuracy Error Accuracy Error Accuracy Error E (kips) = 191.181 (in ²) | | EADIÑG (ksi) | 0:0000 ksi 0:0000 ksi 0:0050 ksi 0:0100 ksi 0:0275 ksi 0:0275 ksi 8:5120 ksi 0 + -8.3 | | r | |
| En En Ma FORC | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge Interpolation Error Accuracy Error Error Error Error Accuracy Error Accuracy Error | X GAÚGE F | EADIÑG (ksi) | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0275 ksi 0.0275 ksi 0.0275 ksi 8.5120 ksi 9 (Not < 0.6666 | | r I | |
| En En Ma FORCI Correla Maximi | Error In Standard Interpolation in Gauge Accuracy of Gauge Interpolation in Master Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge Fors:In Field Use of Gauge Interpolation Error Accuracy Error Error Ratio In Jack | X GAÚGE F | EADING (ksi) | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0275 ksi 0.0275 ksi 8.5120 ksi 9 (Not < 0.6666 0075 | 57) | | |
| En En Ma FORC Correla Maximi Maximi | Error In Standard Interpolation in Gauge Accuracy of Gauge rors In Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge Interpolation Error Accuracy Error Error Error Error Accuracy Error Accuracy Error | X GAUGE F | EADING (ksi) | 0.0000 ksi 0.0000 ksi 0.0050 ksi 0.0100 ksi 0.0275 ksi 0.0275 ksi 0.0275 ksi 8.5120 ksi 9 (Not < 0.6666 0075 0049 Topi | | | |

| | • • • • • • • | ULIC JACK C | DOCUMENT N DOCUMENT T REVISION # SAFETY RELA' NON-SAFETY | ENG 0 X | | | |
|-------------------------------------|---------------------------------|---------------|--|---------------|---------------|-------|----|
| Corporation | NON-SAFETY RELATED PAGE 3 OF | 3 09/29/10 | | | | | |
| Project: POST | WOLF CREEK | | | Contr | act No: N105 | 4 | |
| Jack Description | PINE | Size: | <u>850</u> To | ns Regis | ster No: 6001 | | ź |
| | A | 1 | | N. 8 | | -00 | •< |
| Theoretical Ram | Area: <u>190.45</u> sq. | 1615 | | Max | Pressure: 8 | 500 p | si |
| Theoretical Ram Calibrating Devi | | | No: <u>61195</u> | | · · · · | P | SI |

Data From Current CalibrationArea (A_f):191.181 sq.in,Constant (C_f):-8.352 kipsMax Pressure (P):8500 psi

Data From Previous Calibration

| Area (A _i): | 190.250 | sq | in. |
|----------------------------|---------|----|------|
| Constant (C _i) | -3.18 | 55 | kips |

$$\frac{i-f}{i} \times 100\% = -0.168\%$$

WHERE:

 $i = (A_i \times P) + (C_i * 1000)$ $f = (A_f \times P) + (C_f * 1000)$

| PSG Precipion Surveillance Corporation | СОМРИ | HYDRAULIC Jack Cal | ibr | ation Re | cord | N ewed by: | DOCUMENT N DOCUMENT TY REVISION # SAFETY RELAT NON-SAFETY F PAGE BAG | (PE: | ENG 0 X F 3 11/03/10 |
|--|--------|-----------------------|--------------|---------------------------------------|-------------------------------------|---------------|--|-------------------|----------------------------------|
| | | | | | | CWED DI. | <u>, 07, 0,</u> | DATE. | 11105/10: |
| Project: POST T | | | | | | Contra | act No: N106 | 3 | |
| Jack Description: | | | | Size: <u>85</u> | 0 Tons | Regist | er No: 6001 | | |
| Theoretical Ram A | | | | | | Max P | ressure: 85 | 00 | psi |
| | | MOREHOUSE | | - | | Const | | | |
| Calibrating Gauge | | | | gister No: | | | ate: 07/28 | /12 | |
| Raw Data By: <u>C</u> | | | 20 4 12 6 | 64-7 | Witness: <u>N/</u> | <u>A</u> | | | |
| Mean Ram Area: | 190. | 734 sq. in. K= -7 | .92 9 | kips | Agency: <u>N/</u> | | | ate: <u>N/A</u> | |
| Computed By: <u>D</u> | _ | | | · · · · · · · · · · · · · · · · · · · | QC Check: | | isson | | |
| Title: FIELD ENC | SINEER | Date | 11 | /03/10 | Title: $\mathcal{Q}A \gamma \gamma$ | anage | Da | ate: 11/3/1 | 0 |
| | | | | | | 0 | | | |
| Target Pressure (| PSI) | Gauge Reading (PS | SI) | Load C | ell Readout | | Comme | nts | |
| 1000 | | 1039. | | 1 | 9145 | RUN: 1 | POSI | TION: <u>1.5'</u> | 1. |
| 2000 | | 2040 | | 3 | 8140 | | | | |
| 3000 | | | | 5 | 6485 | | | | |
| 4000 | | 4024 | | 7 | 5865 | | | | |
| 5000 | | 5017 | | 9 | 4780 | | | | |
| 6000 | | 6010 | | 1 | 13775 | | | | |
| 7000 | | 7020 | | 13 | 33065 | | | | |
| 8000 | | 8008 | | 1! | 51905 | | • | | |
| 8500 | | 8519 | | 1(| 61580 | | | | |
| | | | | | | | | | |
| 1000 | | 1027 | | 1 | 8980 | RUN: 2 | POSI | FION: 3" | |
| 2000 | | 2014 | | 3 | 7525 | | | | |
| 3000 | | 3014 | | 5 | 6570 | | | | |
| 4000 | | 4040 | | 7 | 6255 | | | | |
| 5000 | | 5004 | | 9 | 4660 | | | | |
| 6000 | | 6023 | | 11 | 4090 | | | | |
| 7000 | | 7022 | | 13 | 33050 | | | | - |
| 8000 | | 8008 | | 15 | 51895 | | | | |
| 8500 | ľ | 8518 | | 16 | 61605 | | | | |
| | | ······· | | | | | | | |
| 1000 | | 1006 | | . 1 | 8440 | RUN: 3 | POSI | 'ION: 4.5" | |
| 2000 | | 2015 | | 3 | 7525 | | | | |
| 3000 | | 3014 | | 5 | 6590 | | | | |
| 4000 | | 4012 | | 7 | 5735 | | | | |
| 5000 | | 5010 | | 9 | 4820 | | | | |
| 6000 | | 6024 | | 11 | 4130 | | | | |
| 7000 | | 7036 | | 13 | 3445 | | | | |
| 8000 | | 8022 | | 15 | 2205 | | | | Í |
| 8500 | | 8507 | | 16 | 1495 | | | | |
| | | | | | | | т | pical Report 2 | 04 |

| | | | | | | Ĺ | OCUMEN | IT NO: | | | |
|----------------------|---------------------------------------|--|---|------------------|--|---------------|----------------------|------------|---------|--|--|
| | | بغرت عادانا الماد | بم ويشر تر تش | | undan darka ar | | OCUMEN | IT TYPE: | | ENG | |
| | HYDRAULIC JACK CALIBRATION | | | | | | | # | | 0 | |
| XOX | | T inoor D | orragion | Analysi | · · · · · · | | SAFETY RELATED X | | | | |
| | | | | | | | | | TED | | |
| reigion Serveillance | | | | | | F | ION-SAFE | | | 1 | |
| Corporation | | H. Stat | | | | | PAGE | | 2 OF | 3 | |
| | COMPUTED BY: | DJM | DATE: | 11/03/10 | REVIEWED | BY: | BAG | | DATE: 1 | 1/03/10 | |
| roject: POST T | M | | | | | Contract | No: N1 | 063 | | | |
| ack Description: | PINE | | Size: | 850 Ton | . د م بید ا | Register I | | | | <u>`````````````````````````````````````</u> | |
| heoretical Ram Are | · · · · | sq. in. | 0,207 | | | Max Pres | | | psi | | |
| alibrating Device U | | HOUSE | Register No | 61195 | | Constant: | | .0031 | P | | |
| alibrating Gauge U | | | Register No | | | Due Date | | /28/12 | | | |
| | • . | | | <u></u> | | | | | | ÷ | |
| | Actual Gauge R | eading (psi) | Load C | ell Readout | Com | puted Fo | orce (kips) |) | | | |
| | 1039 | | 19 | 145.00 | | 191.5 | 09 | | | | |
| | 2040 | · · · · · · · · · · · · · · · · · · · | | 140.00 | ľ | 381.5 | 18 | | | | |
| | 3013 | Manager and Manager and Manager and Manager and Manager and Manager and Manager and Manager and Manager and Man | | 485.00 | | 565.0 | 25 | | | | |
| | 4024 | | | 865.00 | | 758.8 | | · . | | | |
| | .5017 | | | 780.00 | | 948.0 | | | | | |
| <u> </u> | 6010 | | | 3775.00 | | 1138.1 | | | | | |
| Ĺ. | 7020 | | | 3065.00 | | 1331.0 | | | | | |
| | 8008 8519 | | | 1905.00 | | 1519.5 | | | | | |
| | | | | 580.00 | | 1616.3 | | | | | |
| ļ | 1027 | | | 980.00 | | 189.8 | | | | | |
| | 2014 | | | 525.00 | | 375.3 | <u>```</u> | | | | |
| | 3014 | | | 570.00 | | 565.8 | | | | | |
| | 5004 | | | 255.00 660.00 | | 762.7 | | | | | |
| | 6023 | | | 1090.00 | | 946.8 | | | | | |
| | 7022 | | | 3050.00 | | 1330.8 | | | | | |
| | 8008 | | | 1895.00 | | 1519.4 | | | | | |
| | 8518 | | | 605:00 | | 1616.5 | | | | | |
| | 1006 | | | 440.00 | ····· | 184.4 | | | | | |
| · · · · · | 2015 | | | 525.00 | | 375.3 | | | | | |
| <u> </u> | 3014 | i | | 590.00 | | 566.0 | | | | | |
| | 4012 | | | 735.00 | | 757.5 | | | | | |
| | 5010 | and the second second second second second second second second second second second second second second second | | 820.00 | | 948.4 | | | | | |
| <u>⊢</u> – | 6024 | | and the second se | 130.00 | | 1141.6 | | · | | | |
| | 7036 | | | 445.00 | | 1334.8 | | | | | |
| | 8022 | | 152 | 205.00 | | 1522.5 | 22 | | | | |
| 3 | 8507 | | 161 | 495.00 | | 1615.4 | | | | | |
| | | | | | | | | · | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | * Indica | ites these readi | ngs have been o | mitted from | hefinal compu | utations | | | | | |
| Erro | rs in Jack Calibratio | n n | | | | | | | | | |
| <u></u> | | | | | | | 0.0100 | kei | | | |
| | | | | | A Second Sec Second Second Seco | | 0.0000 | ksi ksi | | | |
| | -3 | 7 | ···· | | | | 0.0000 | ksi | | | |
| Erro | rs In Gauge Calibra | - | | | | | 0.000 | nəl | | | |
| | | | | | | | 0.0000 | ksi | | | |
| | | | 19 | | | | 0.0050 | ksi | | | |
| | | | | | | | 0.0100 | ksi | | | |
| | Accuracy of | of Field Gauge | | ····· | | . Na | 0.0275 | ksi | | | |
| Erro | rs In Field Use of G | | | | | | | 191 | | | |
| | | | ***** | | | | 0.0050 | ksi | | | |
| | · · · · · · · · · · · · · · · · · · · | | ••••• | | | | 0.0275 | ksi | | | |
| Max | imum Gauge Readi | | | | | | 8.5190 | ksi | | | |
| , | n n n a nta y Ma | | and the activity of the | | a a garda | | 1 - 1 - - | | | | |
| | | | | | | | | | | | |
| FORCE | (kips) = 19(|).734 (in²) | XC | GAUGE I | READING | 6 (ksi) : | + | -7.929 | (kips) | | |
| Correlati | on = 0.9999985 | 9. | | | N/NO = | 1.0000 | + (Not < (| | (kips) | | |
| Correlati Maximun | | 9 Kanada (1997) | | | N/NO = | 1.0000 0.0 | (Not < (101 | | (kips) | | |

| | | · · · · · · · · · · · · · · · · · · · | | | DOCUMENT N | 0: | |
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| | | | | | DOCUMENT T | YPE: | ENC |
| toto) | HYDR. | AULIC JACK C | TION | REVISION # | # | | |
| A | Compa | rison With Previo | SAFETY RELA | TED | X | | |
| Recigion Survellance corporation | C ộn pu | | You Quite | A CALLONA | NON-SAFETY I | RELATED | |
| Coremotian | | | | | PAGE | 3 0 | DF 3 |
| | COMPUTED BY: | DJM DATE: | 11/03/10 | REVIEWED BY: | BAG | DATE: | 11/03/10 |
| | | | | | | · . | |
| Project: POST | ТМІ | | | Contr | act No: N106 | 3 | , |
| Jack Description | : PINE | Size: | 850 Tor | ns Regis | ter No: 6001 | | |
| Theoretical Ram | Area: 190.45 s | q. iń. | | Max I | Pressure: 85 | 500 | psi |
| Calibrating Device | e Used: MOREH | OUSE Register | No: 61195 | Cons | tant: 10.00 |)31 | |
| Calibrating Gaug | e Used: HEISE | Register | No: 4 | 4084 Due (| Date: 07/28 | 3/12 | |
| Da | ta From Current Ca | alibration | Data F | rom Previous C | alibration | | |
| | a (A _f): 190.734 | | Area (/ | | | | |
| | | 29 kips | | | 52 kips | | |
| Ма | | 8500 psi | | | -1 | | |

$$\frac{i-f}{i} x 100\% = 0.209\%$$

WHERE:

 $i = (A_f \times P) + (C_f * 1000)$ $f = (A_f \times P) + (C_f * 1000)$

| | HYDRAULIC JAC Jack Calibra | | • | I | DOCUMENT N DOCUMENT T REVISION # SAFETY RELA | YPE: TED | ENG 0 X |
|---------------------------------------|---|-----------------------|------------------|----------|---|--------------------------|---------------|
| Precision Surveillance Corporation | UTED BY: DJM I | DATE: 10/07/ | 0. REVIE | WED BY: | NON-SAFETY PAGE BAG | RELATED I OF DATE: | 3 10/07/10 |
| | | | | | | | |
| Project: POST WOLF | 11. | | | | ct No: N105 | 4 | |
| Jack Description: PIN | | Size: 850 | Tons | • | er No: 6002 | | |
| Theoretical Ram Area: | | | | | ressure: 8 | | si |
| Calibrating Device Used | | gister No: 61 | | Consta | | | |
| Calibrating Gauge Used | | gister No: 440 | | Due Da | ate: 07/28 | 6/12 | |
| Raw Data By: DANIE | TAN AND AND AND AND AND AND AND AND AND A | A | ness: <u>N/A</u> | | | | |
| Mean Ram Area: 19 | | kips Ag | | | | ate: <u>N/A</u> | |
| Computed By: DAVID | | | Check: | | | | - |
| Title: FIELD ENGINEE | R Date: 10 | 07/10 Titl | e: QA Ma | mages | Da | ate: 10/8/10 | |
| Torget Dressure (DOI) | Course Baseline (DSIN | Load Cell F | loodout T | ~ | Comme | | |
| Target Pressure (PSI) | Gauge Reading (PSI) | | | | | | |
| 1000 | 1000 | 18420 | | RUN: 1 | P05i | TION: <u>1.5</u> " | |
| 2000 | 2015 | 37440 | | | | | |
| 3000 | 3002 | 56290 | | | | | |
| 4000 | 4000 | 75480.00 | | | | | |
| 5000 6000 | <u> </u> | 94880.00 113880.00 | | | | | |
| 7000 | 7005 | 133005 | | | | | |
| 8000 | 8001 | 152060 | | | | | |
| 8500 | 8506 | 161705 | | | | | |
| | 0000 | 101700 | .00 | | | | |
| 1000 | 1000 | 18370. | 00 | RUN: 2 | POSI | TION: 3" | ' |
| 2000 | 2007 | 37570 | | <u> </u> | | <u> </u> | |
| 3000 | 3002 | 56550 | | | | | |
| 4000 | 4006 | 75790 | | | | | |
| 5000 | 5004 | 94920. | | | | | , |
| 6000 | 6003 | 114090 | | | | | |
| 7000 | 7006 | 133270 | | | | | |
| 8000 | 8000 | 152260 | | | | | |
| 8500 | 8503 | 161890 | .00 | | | | |
| | | | | | | | |
| 1000 | 1001 | 18505 | 00 | RUN: 3 | POSI | TION: 4.5" | |
| 2000 | 2003 | 37600. | 00 | - · · · | | | |
| 3000 | 3004 | 56750. | 00 | | | | |
| 4000 | 4006 | 75980. | 00 | | | | |
| 5000 | 5003 | 95030. | 00 | | | | |
| 6000 | 6001 | 114170 | .00 | | | | |
| 7000 | 7000 | 133260 | .00 | | | | |
| 8000 | 8002 | 152455 | .00 | | | | |
| 8500 | 8501 | 162005 | .00 | | | | |
| 1 | ÷ • | | - | | То | bical Report 204 | Povien |

| | | | | DOCUMENT NO | ź. |
|--|--|---|---|---------------------------------------|------------------------|
| | | المراجع المراجع المراجع المراجع | | DOCUMENT TY | PE: ENG |
| | HYDRAULIC. | JACK CALIBRA | LION | REVISION # | 0 |
| A A | Linear Re | gression Analysis | | SAFETY RELAT | ED X |
| | | 0 | | NON-SAFETY R | ELATED |
| Precision Surveillance Conportation | | | | PAGE | 2 OF 3 |
| | COMPUTED BY: DJM | DATE: 10/07/10 | REVIEWED BY: | BAG | DATE: 10/07/10 |
| Project: POST | WOLF CREEK | | Contrac | No: N1054 | <u> </u> |
| Jack Description: | PINE | Size: 850 Tons | | · · · · · · · · · · · · · · · · · · · | |
| Theoretical Ram Are | ea: 190.45 sq. in. | | Max Pre | | psi |
| Calibrating Device L | | Register No: 61195 | Constar | nt: 10.0031 | |
| Calibrating Gauge U | HEISE | Register No: 44084 | Due Da | te: 07/28/12 | 2 |
| | Actual Gauge Reading (psi) | Load Cell Readout | Computed | Force (kips) | |
| | 1000 | 18420.00 | | .257 | |
| | 2015 | 37440.00 | | .516 | |
| | 3002 | 56290.00 | 563 | .074 | |
| | 4000 | 75480.00 | | .034 | |
| <u> </u> | 5009 | .94880.00 | | .094 | |
| <u>⊢</u> | <u> 6005 </u> | 113880.00 133005.00 | | 9.153 0.462 | |
| | 8001 | 152060.00 | | 1.071 | |
| | 8506 | 161705.00 | | 7.551 | |
| | 1000 | 18370.00 | 183 | .757 | |
| | 2007 | 37570.00 | | .816 | |
| · | 3002 | 56550.00 | | .675 | |
| | 4006 | 75790.00 | | .135 .494 | |
| | 6003 | 94920.00 | | .494 | |
| | 7006 | 133270.00 | | 3.113 | |
| | 8000 | 152260.00 | 1523 | 3.072 | |
| | 8503 | 161890.00 | | 9.402 | |
| | 1001 | 18505.00 | the second second second second second second second second second second second second second second second se | .107 | |
| | 2003 | 37600.00 | | .117 .676 | |
| | 4006 | 56750.00 75980.00 | | .036 | |
| | 5003 | 95030.00 | | .595 | |
| | 6001 | 114170.00 | | 2.054 | |
| | 7000 | 133260.00 | | 3.013 | |
| ļ | 8002 | 152455.00 | | 5.023 | |
| | 8501 | 162005.00 | 1620 | 0.552 | |
| | | | | | |
| \vdash | ······································ | | | | |
| | * Indicates these reading | s have been omitted from th | efinal computations | | |
| C. | ors In Jack Calibration | | | | |
| <u></u> | | | | 0.0100 ksi | |
| | | | | | |
| | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | |
| Erro | ors In Gauge Calibration | | | | |
| | | ••••••••• | | | |
| | Accuracy of Master | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | 0.0050 ksi 0.0100 ksi | |
| | | •••••••••••••••••••••••••••••••••••••• | | | |
| Erro | ors In Field Use of Gauge | | | | |
| · | Interpolation Error | •••••••••• | - | | |
| | | | | | |
| Max | umum Gauge Reading Used | ••••••••••••••••••••••••••••••••••••••• | ···`` | 8.5060 ksi | |
| | | | | | |
| FORCE | $(kips) = 191.381 (in^2)$ | X GAUGE R | EADING (ksi |) + -8.2 | 75 (kips) |
| Correlat | ion = 0.99999468 | | N/NO = 1.000 | 0 (Not < 0.6666 | 57) |
| | m Error Ratio In Jack | | | 0099 | |
| | m Error Ratio In Gauge | | | e di sul | al Report 204 Revion 0 |
| Maximu | m Total Error Ratio | | | .0110 Attac | hment 8.7 Page 183 of |

| | HYDRAULIC JACK CALIBRATION Comparison With Previous Calibration | | | | | DOCUMENT NO: DOCUMENT TYPE: REVISION # SAFEFY RELATED NON-SAFETY RELATED | | | ENG 0 X | |
|---------------------------------------|--|--------|-------------|------------------|--------|--|----------------------|-----------|---------------|-------------|
| Pricigion Surveillance Corporation | COMPUTED BY: | DIM | DATE: | 10/07/10 | REVIEW | ED BY: | PAGE BAG | 3 DATE | OF 10 | 3 /07/10 |
| Project: POST | WOLF CREEK | | | | | Contra | act No: N10 | 54 | | |
| Jack Description | : PINE | | Size: 8 | 350 To | าร | Regis | ter No: 600 | 2 | i | |
| Theoretical Ram | Area: 190.45 s | q. in. | | | | Max F | Pressure: <u>(</u> 8 | 3500 | psi | |
| | e Used: MOREH | OUSE | _Register N | o: <u>61:195</u> | | _Const | ant: <u>10.0</u> | 031 | | |
| Calibrating Gaug | e Used: HEISE | | Register N | o: 4 | 4084 | Due D |)ate: 07/2 | 28/12 | | |

Data From Current CalibrationArea (A_t):191.381 sq.in.Constant (C_t):-8.275 kipsMax Pressure (P):8500 psi

Data From Previous Calibration

Area (Ai): 190,932 sq.in. Constant (Ci): -7.789 kips

$$\frac{i-f}{i} x 100\% = -0.206\%$$

WHERE:

 $i = (A_i \times P) + (C_i * 1000)$ $f = (A_f \times P) + (C_f * 1000)$

| PSC PSC Perception Summellinging Perception Summellinging Construction | | ation Record | ON DOCUMENT NO: DOCUMENT TYPE: REVISION # SAFETY RELATED PAGE VIEWED BY: BAG DOCUMENT NO: ENC ENC A ENC A ENC A ENC A ENC A A A A A A A A A |
|--|-------------------|---------------------------|--|
| | | | |
| Project: POST TM | | | Contract No: N1063 |
| | PINE | Size: 850 Tons | Register No: 6002 |
| Theoretical Ram Are | | | Max Pressure: <u>8500</u> psi |
| | sed: MOREHOUSE Re | | Constant: 10.0031 |
| Calibrating Gauge U | | gister No: 44084 | Due Date: 07/28/12 |
| Raw Data By: DA | | W392-74 | · · · · · · · · · · · · · · · · · · · |
| Mean Ram Area: | | kips Agency: I | |
| Computed By: DA | | QC Check | ABussione |
| Title: FIELD ENGIN | IEER Date: 11 | /03/10 Title: \$\vec{Q}_A | Manazin Date: 11/3/10 |
| Tana Pasa Pasa | | | |
| Target Pressure (PS | | Load Cell Readout | |
| 1000 | 1016 | 18925 | RUN: <u>1</u> POSITION: <u>1.5"</u> |
| 2000 | 2006 | 37580 | _ |
| 3000 | 3017 | 56875 | - |
| 4000 | 4006 | 75850 | - |
| 5000 | 5020 | 95245 | - |
| 6000 | 6015 | 114290 | |
| 7000 | 7027 | 133645 | |
| 8000 | 8024 | 152630 | |
| 8500 | 8511 | 161890 | - 1 |
| 1000 | 1032 | 19275 | RUN: 2 POSITION: 3" |
| 2000 | 2003 | 37745 | FOSITION: <u>5</u> |
| 3000 | 3021 | 57050 | |
| 4000 | 4013 | 76045 | - |
| 5000 | 5011 | 95110 | - |
| 6000 | 6016 | 114345 | -1 |
| 7000 | 7011 | 133370 | - |
| 8000 | 8025 | 152680 | |
| 8500 | 8517 | 162155 | |
| <u> </u> | | | |
| 1000 | 1014 | 18845 | RUN: 3 POSITION: 4.5" |
| 2000 | 2031 | 38135 | |
| 3000 | 3021 | 56050 | 7 |
| 4000 | 4017 | 76010 | - |
| 5000 | 5027 | 95285 | 7 |
| 6000 | 6025 | 114375 |] |
| 7000 | 7019 | 133455 | |
| 8000 | 8003 | 152210 | |
| 8500 | 8518 | 162080 | 7 1 |
| | | | Topical Report 204 Revien |

| | | | DO | CUMENT NO: | | |
|---------------------------|---|---|--|---|---|--------|
| (C) | المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع | · • • · · · · · · · · · · · · · · · · · | DO | CUMENT TYPE: | · <u> </u> | ENG |
| A A | U HYDRAULIC | JACK CALIBRATI | ON REV | ISION # | | 0 |
| XºX- | I incor D | egression Analysis | | ETY RELATED | | X |
| | | egression midlysis | | N-SAFETY RELA | TED | |
| Precipion Surveilla | 26 | | 1301 | | 2 OF | 3 |
| Corporation | COMPUTED BY: DJM | DATE:. 11/03/10 R | EVIEWED BY: | | | /03/10 |
| | | DATE: 11/03/10 R | CAICMCD BT: | BAG | DVIE: 1 | 103/10 |
| Project: PO | ST TMI | | Contract No | N1063 | | |
| Jack Description | | Size: 850 Tons | Register No | 6002 | | |
| Theoretical Ram | | | Max Pressu | e: 8500 | psi | |
| Calibrating Devi | ce Used: MOREHOUSE | Register No: 61195 | Constant: | 10.0031 | | |
| Calibrating Gaug | e Used: HEISE | Register No: 44084 | Due Date: | 07/28/12 | | |
| | | | | - (I-T | | |
| | Actual Gauge Reading (psi) | Load Cell Readout | Computed Forc | | | |
| | 1016 | 18925.00 | 189.309 | and the second se | | |
| | 2006 | 37580.00 | 375.916 568.926 | | | |
| | 4006 | 56875.00 | | | | |
| | 5020 | 75850.00 95245.00 | 758.735 | | | |
| | 6015 | 95245.00 | • • • • • • • | | | |
| 1 | 7027 | 133645.00 | 1143.254 | | | |
| | 8024 | 152630.00 | 1536.864 | | | |
| | 8511 | 161890.00 | 1619.402 | | | |
| | 1032 | 19275.00 | 192.810 | ······ | | |
| | 2003 | 37745.00 | 377.567 | | | |
| | 3021 | 57050.00 | 570.677 | | | |
| | 4013 | 76045.00 | 760.686 | | | |
| | 5011 | 95110.00 | 951.395 | | | |
| | 6016 | 114345.00 | 1143.804 | | | |
| | 7011 | 133370.00 | 1334,113 | | | |
| | 8025 | 152680.00 | 1527:273 | | | |
| | 8517 | 162155.00 | 1622.053 | | | |
| | 1014 | 18845.00 | 188.508 | | | |
| | 2031 | 38135.00 | 381.468 | | | |
| | 3021 | 56050.00 | 560.674 | | | |
| | 4017 | 76010.00 | 760.336 | | | |
| | 5027 | 95285.00 | 953.145 | | | |
| | 6025 | 114375.00 | 1144.105 | | | |
| | 7019 | 133455.00 | 1334.964 | | | |
| | 8003 | 152210.00 | 1522.572 | | | |
| | 8518 | 162080.00 | 1621.302 | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | Indicates these readil | noe have been amilled from theil | and computations | | | |
| | | nga nava pean onimeo nom prem | iai computations | | | |
| | Errors In Jack Calibration | iga nave pean origined nom area | iai comporations | | | |
| | Errors in Jack Calibration Error in Standard | | | 0100 ksi | | |
| | Error In Standard | - | 0. | 0100 ksi 0000 ksi | | |
| | Error in Standard | | | 0000 ksi | | |
| | Error in Standard | | | | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration | | | 0000 ksi | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master | | | 0000 kši 0000 ksi | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gaug | | 0 | 0000 ksi 0000 ksi 0000 ksi | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gaug Accuracy of Master | | | 0000 kši 0000 ksi 0000 ksi 0050 ksi | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gaug Accuracy of Master | e | | 0000 kši 0000 ksi 0000 ksi 0050 ksi 0100 ksi | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge. | e | 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0 | 0000 kši 0000 ksi 0000 ksi 0050 ksi 0100 ksi | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge. Errors In Field Use of Gauge Interpolation Error | φ | 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0 | 0000 kši 0000 kši 0050 kši 0100 kši 0275 kši | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge. Errors In Field Use of Gauge Interpolation Error | φ | 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0 | 0000 kši 0000 kši 0050 kši 0100 kši 0275 kši 0050 kši | | |
| | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge Interpolation Error Accuracy Error | (G., | 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0 | 0000 kši 0000 kši 0050 kši 0100 kši 0275 kši 0050 kši 0275 kši | 2 (kips) | |
| FOR | Error In Standard Interpolation in Gauge Accuracy of Gauge Errors in Gauge Calibration Interpolation in Master Interpolation in Field Gauge Accuracy of Master Accuracy of Field Gauge Interpolation Error Accuracy Error. Maximum Gauge Reading Used CE (kips) = 191.019 (in ²) | e X GAUGE RE | 0.000000000000000000000000000000000000 | 0000 kši 0000 kši 0050 kši 0100 kši 0275 kši 0275 kši 5180 kši 5180 kši | 2 (kips) | |
| FOR | Error In Standard | e X GAUGE RE | 0.000000000000000000000000000000000000 | 0000 kši 0000 kši 0050 kši 0100 kši 0275 kši 0275 kši 5180 kši - 5.932 (Not. < 0.66667) | 2 (kips) | |
| FOR Corr Max | Error In Standard | e X GAUGE RE | 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0 | 0000 kši 0000 kši 0050 kši 0100 kši 0275 kši 0275 kši 5180 kši 5180 kši (Not < 0.66667) 4 | | evior |
| FOR Corr Max Max | Error In Standard | eX GAUGE RE | 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.008- 0.004- 0.004- 0.004- 0.008- 0.004- 0.008- 008- | 0000 kši 0000 kši 0050 kši 0050 kši 0275 kši 0050 kši 0275 kši 5180 kši -5.932 (Not < 0.66667) 4 Topical | kips) Report 204 F nent 8.7 Page | |

| | | | | | ······ | DOCU | MENT NO: | | | · |
|--------------------------------------|--|----------------|-------|----------|-----------------|---------------------------|-------------------|-------|-----|--------|
| | | | | | | DOCU | DOCUMENT TYPE: | | | ENG |
| | HYDRAULIC JACK CALIBRATION | | | | | REVISION # | | | | O |
| | Comparison With Previous Calibration | | | | SAFE | FY RELATE | Ď | | X | |
| | | | | | C | NON- | SAFETY RE | LATED | | |
| Recigion Surpeillance Corporation | | | | F | AGE | 3 | OF | :3 | | |
| | | 1.1.1.1 | A | 4.4 6 81 | | | China and and and | | | |
| | COMPUTED BY: | DJM | DATE: | 11/03/10 | REVIÈWED | BY: I | BAG | DATE: | 10 | /03/10 |
| Droigate DOCT | | ĎJM | DATE: | 11/03/10 | | | | DATE: | 11 | /03/10 |
| Project: POST | | DJM | DATE: | 11/03/10 | | BY: | | DATE: | | /03/10 |
| Project: POST Jack Description | ТМІ | DJM | DATE: | | С | |): N1063 | DATE: | | /03/10 |
| | TMI n: PINE | DJM sq. in. | | | C ns. F | ontract No | b: N1063 6002 | | psi | |
| Jack Description | TMI n: <u>PINE</u> n Area: <u>190.45</u> s | sq. in. | | 50 Tor | C ns. F N | ontract No legister No | b: N1063 6002 | 0 | | |

Data From Current CalibrationArea (A_f):191.019 sq.in.Constant (C_f):-5.932 kipsMax Pressure (P):8500 psi

Data From Previous Calibration

| Area (A _i): | 191.381 sq | in. |
|-------------------------|------------|------|
| Constant (Ci) | -8.275 | kips |

$$\frac{i-f}{i} \times 100\% = 0.045\%$$

WHERE:

 $i = (A_i \times P) + (C_i * 1000)$ $f = (A_f \times P) + (C_f * 1000)$

| Prington Survetlance Corporation | | ation Record | ON DOCUMENT NO: ENG DOCUMENT TYPE: ENG REVISION # 0 SAFETY RELATED X NON-SAFETY RELATED X PAGE 1 OF EVIEWED BY: BAG DATE: 10/07/10 |
|-------------------------------------|---------------------------------------|------------------|--|
| Project: PRE TMI | | | Contract No: N1063 |
| Jack Description: M/ | AGNUS | Size: 1000 Tons | Register No: 9400 |
| Theoretical Ram Area: | | | Max Pressure: 8500 psi |
| | d: MOREHOUSE Re | aister No: 61195 | Constant: 10.0031 |
| Calibrating Gauge Use | · | gister No: 44084 | Due Date: 07/28/12 |
| Raw Data By: DANI | | | N/A |
| Mean Ram Area: 23 | 5:787 sq. in. K= -6:961 | kips Agency: | |
| Computed By: DAVIE | | QC Check | |
| Title: FIELD ENGINE | | | |
| | | | 0) |
| Target Pressure (PSI) | Gauge Reading (PSI) | Load Cell Readou | t Comments |
| 1000 | 1003 | 22960.00 | RUN: 1POSITION: 4" |
| 2000 | 2003 | 46475.00 | |
| 3000 | 3004 | 70075.00 | |
| 4000 | 4002 | 93635.00 | |
| 5000 | .5005 | 117330.00 | |
| 6000 | 6004 | 140890.00 | |
| 7000 | 7010 | 164865.00 | |
| 8000 | 8001 | 188250.00 | |
| | · · · · · · · · · · · · · · · · · · · | | |
| | | | |
| 1000 | 1010 | 23150.00 | RUN: 2 POSITION: 8" |
| 2000 | 2007 | 46430.00 | |
| 3000 | 3003 | 70140.00 | |
| 4000 | 4003 | 93805.00 | |
| 5000 | 5004 | 117335.00 | |
| 6000 | 6008 | 140815.00 | |
| 7000 | 7013 | 164640.00 | |
| 8000 | 8006 | 188005.00 | |
| | | | <u> </u> |
| | | | |
| 1000 | 1001 | 22890.00 | RUN: <u>3</u> POSITION: <u>12"</u> |
| 2000 | 2004 | 46560.00 | I |
| 3000 | 3007 | 70290.00 | I |
| 4000 | 4005 | 93650.00 | <u> </u> |
| 5000 | 5002 | 117160.00 | { |
| 6000 | 6003 | 140640.00 | I |
| 7000 | 7000 | 164110.00 | { |
| 8000 | 8006 | 187600.00 | <u>_</u> |
| : | | | |
| ۶ | | | Topical Report 204 Revien 0 Attachment 6.7 Page 166 of |

| | | | DOCUMENT | DOCUMENT NO: | | | |
|--|--|-----------------------------------|---|--|--------------------------------------|---|-------|
| 3436 7 | | T TA: T & ATT A & | | DOCUMEN | ГТҮРЕ: | | ENG |
| | HYDRAU | LIC JACK CALIE | RATION | REVISION # | | | 0 |
| Xox) | Line | ar Regression Anal | veis | SAFETY RE | LATED | | X |
| | L'IIIO | ur ixogroooivii rxiidi | Joio | NON-SAFET | | <u>, </u> | |
| Receipton Surveillance Corporation | | | | PAGE | 2 | OF | - 3 |
| Corporation | COMPUTED BY: 1 | DIM DATE: 10/0 | 7/10 REVIEWED BY: | | DÁT | | 07/10 |
| | | | | | | | 01110 |
| Project: PRE T | | | | act No: N10 | | | |
| Jack Description: | MAGNUS | Size: 1000 | → 1 11 | iter No: 940 | | | |
| Theoretical Ram Are | | | | Pressure: 850 | | psi | |
| Calibrating Device U | | | 195 Cons | | 0031 | | |
| Calibrating Gauge U | sed: HEISE | Register No: 44 | 084 Due [| Date: 07/2 | 28/12 | | |
| | Actual Gauge Reading (p | si) Load Cell Rea | dout Compute | d Force (kips) | | | |
| | 1003 | 22960.00 | | 29.671 | | | |
| · | 2003 | 46475.00 | · · · · · · · · · · · · · · · · · · · | 64.894 | | | |
| | 3004 | 70075.00 | | 00.967 | | | |
| | 4002 | 93635.00 | | 36.640 | | | |
| | 5005 | 117330.00 | | 73.664 | | | |
| | 6004 | 140890.00 | | 09.337 | | | |
| | 7010 | 164865.00 | | 49.161 | | | |
| | 8001 | 188250.00 | 18 | 83.084 | | | |
| | 1010 | 23150.00 | 2 | 31.572 | | | |
| | 2007 | 46430.00 | · | 64.444 | | | |
| | 3003 | 70140.00 | · · · · · · · · · · · · · · · · · · · | 01.617 | | | |
| | 4003 | 93805.00 | | 38,341 | | | |
| | 5004 | 117335.00 | | 73:714 | | | |
| | 6008 | 140815.00 | | 08.587 | | | |
| | 7013 | 164640.00 | | 46.910 | | | |
| | 1001 | 188005.00 | | 80.633 | | | |
| | 2004 | 46560.00 | | 228.971 465:744 703.118 936.790 1171.963 | | | |
| | 3007 | 70290.00 | | | | | |
| | 4005 | 93650.00 | | | | | |
| | 5002 | 117160.00 | | | | | |
| | 6003 | 140640.00 | | 06.836 | | | |
| | 7000 | 164110.00 | | 41.609 | | | |
| | 8006 | 187600.00 | | 76.582 | | | |
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| | * Indicates these | e readings have been omitted | from thefinal computation | ins | | | |
| Erro | ors In Jack Calibration | | | | | | |
| | Error In Standard | | | 0.0100 | ksi | | |
| | Interpolation in Gau | 90 | | 0.0000 | ksi | | |
| | Accuracy of Gauge | | ***** | 0.0000 | ksi | | |
| | A STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD STANDARD S | | | | | | |
| Erre | ors In Gauge Calibration | | | 0.0000 | ksi | | |
| Enc | | ter, | ***** | 0.0000 | | | |
| En | Interpolation in Mas | ter t Gauge | | State State | ksi | | |
| End | Interpolation in Mas Interpolation in Field Accuracy of Master | d Gauge | ، | 0.0050 0.0100 | ksi ksi | | |
| | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G | d Gauge | ، | 0.0050 0.0100 | 44 J. | | |
| | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge | j Gauge auge | 4, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, | 0.0050 0.0100 0.0275 | ksi ksi | | |
| | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge Interpolation Error. | J Gauge | 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 | 0.0050 0.0100 0.0275 | ksi ksi ksi | | |
| Erro | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge Interpolation Error. Accuracy Error | J Gauge | ، | 0.0050 0.0100 0.0275 0.0050 0.0275 | ksi ksi ksi | | |
| Erro | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge Interpolation Error. Accuracy Error | J Gauge | ، | 0.0050 0.0100 0.0275 0.0050 0.0275 | ksi ksi ksi | | |
| <u>Errc</u> Ma | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge Interpolation Error Accuracy Error dmum Gauge Reading Used | J Gauge | | 0.0050 0.0100 0.0275 0.0050 0.0275 8.0060 | ksi ksi ksi ksi ksi | (kips) | |
| <u>Errc</u> Mar FORCE | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge Interpolation Error Accuracy Error dmum Gauge Reading Used (kips) = 235.787 | J Gauge | ĜE READINĞ (k | 0.0050 0.0100 0.0275 0.0050 0.0275 8.0060 si) + - | ksi ksi ksi ksi ksi | (kips) | |
| <u>Errc</u> Mar FORCE Correlat | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Field G ors In Field Use of Gauge Interpolation Error Accuracy Error dmum Gauge Reading Used (kips) = 235.787 ion = 0.99999592 | iauge (in ²) X GAU | GE READING (k N/NO = 1.0 | 0:0050 0:0275 0:0050 0:0275 0:0275 8:0060 si) + - | ksi ksi ksi ksi ksi | (kips) | |
| Erro Max FORCE Corretat Maximu | Interpolation In Mas Interpolation in Field Accuracy of Master Accuracy of Master Accuracy of Field G Interpolation Error Accuracy Error dmum Gauge Reading Used (kips) = 235.787 Ion = 0.99999592 m Error Ratio In Jack | j Gauge auge: (in²) X GAU | GE READING (k N/NO = 1.0 | 0:0050 0:0275 0:0275 0:0275 0:0275 8:0060 si) + - | ksi ksi ksi 6.961 66667) | | |
| Erro Max FORCE Correlat Maximu Maximu Maximu | Interpolation in Mas Interpolation in Field Accuracy of Master Accuracy of Master Accuracy of Field G Interpolation Error Accuracy Error dmum Gauge Reading Used (kips) = 235.787 ion = 0.99999592 m Error Ratio in Jack m Error Ratio in Gauge | iauge (in ²) X GAU | SE READING (k N/NO = 1.0 | 0:0050 0:0275 0:0275 0:0275 0:0275 8:0060 si) + - 0:00 (Not < 0 0:0039 0:0052 | ksi ksi ksi ksi ksi | ort 204 Re | |

| *** ** | <u></u> | | ····· | | DOCUMENT NO | ж. — | |
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| | HYDRAULIC | - | DOCUMENT TY | PE: | ENG 0 | | |
| (XoX) | | | REVISION # SAFETY RELATED NON-SAFETY RELATED | | | | |
| TX | Comparison W | تنز | | | | | |
| Precision Serveillance | | | | <u> </u> | PAGE | 3 OF | |
| Corporation | COMPUTED BY: DJM | DATE: 10/07 | /10 REVIEW | ED BY: | BAG | | 10/07/10 |
| | | | | | | | |
| Project: PRE T | M | | | Contra | ct No: N1063 | j. | |
| Jack Description | MAGNUS | Size: 1000 | Tons | Registe | er Nô: 9400 | | |
| | Area: 235.62 sq. in. | | - | ~ | essure: 85 | 00 p | si |
| | e Used: MOREHOUSE | Register No: 61 | 195 | Consta | | | |
| | e Used: HEISE | Register No: | 44084 | Due Da | : winn second and an and a second second second second second second second second second second second second | | - |
| 9 | | | 1,100,1 | | | 1, dau | |
| Da | ta From Current Calibration | Ďa | ata From Prev | vioue Cal | ibration | | |
| · Englished | ea (A _f): 235.787 sq.in. | | | 232.058 | | | |
| | nstant (C): -6.961 kips | | | | kips | | |
| | | | onstant (C _i): | 1.079 | kips | | |
| Ma | x Pressure (P): 8500 p | si | | | | | |
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| | i c | | | | | | |
| | $\frac{i-f}{i}x100$ | 0 / | | | | | |
| | x100 | 1% = -1.1 | 68% | | | | |
| | i | | | | | | |
| | . V , | | | | | | |
| | | | | | | | |
| | WHERE: | | | | | | |
| | $i = (\Delta, \mathbf{x}, \mathbf{P})$ | + (C _i * 1000) | | | | | |
| | i = (i + i) | | 1 | | | | |
| | $f = (A, \mathbf{x} \mathbf{P})$ | + (C _f * 1000) | Ń | | | | |
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Topical Report 204 Revion Attachment 8.7 Page 190 ot 523

| Tracigian Summellando opportion | | CK CALIBRATIO ration Record | N DOCUMENT NO: DOCUMENT TYPE: E REVISION # SAFETY RELATED NON-SAFETY RELATED PAGE 1 OF IEWED BY: BAG DATE: 11/03 |
|------------------------------------|---------------------------------------|--------------------------------|--|
| | | | |
| Project: POST TM | | | Contract No: N1063 |
| Jack Description: | MAGNUS | Size: 1000 Tons | Register No: 9400 |
| Theoretical Ram Are | ea: <u>235.62</u> sq. in. | | Max Pressure: 8500 psi |
| Calibrating Device L | Jsed: MOREHOUSE R | egister No: 61195 | Constant: 10.0031 |
| Calibrating Gauge U | Jsed: HEISE R | egister No: 44084 | Due Date: 07/28/12 |
| | NIEL O'SHEA Date: 1 | | /Α |
| Mean Ram Area: | 235.377 sq. in. K= -12.1 | 66 kips Agency: N | |
| Computed By: DA | | QC Check: | |
| Title: FIELD ENGIN | NEER Date: 1 | 1/03/10 Title: 04 | Manager Date: 11/3/10 |
| | | | \mathcal{U}_{i} is a set of \mathbf{r}_{i} , \mathbf{r}_{i} |
| Target Pressure (P | SI) Gauge Reading (PSI) | Load Cell Readout | Comments |
| 1000 | 1015 | 22865 | RUN: <u>1</u> POSITION: <u>4"</u> |
| 2000 | 2017 | 46275 | |
| 3000 | 3015 | 69745 | |
| 4000 | 4016 | 93410 | |
| 5000 | 5011 | 116900 | _ |
| 6000 | 6022 | 140780 | |
| 7000 | 7026 | 164445 | |
| 8000 | 8034 | 188060 | |
| | · · · · · · · · · · · · · · · · · · · | | |
| <u></u> | | | |
| 1000 | 1009 | 22620 | RUN: 2 POSITION: 8" |
| 2000 | 2013 | 46105 | |
| 3000 | 3012 | 69640 | |
| 4000 | 4010 | 93170 | |
| 5000 | 5007 | 116710 | _ |
| 6000 | 6009 | 140210 | |
| 7000 | 7012 | 163735 | |
| 8000 | 8012 | 187315 | _ |
| | | | 4 |
| | | | |
| 1000 | 1010 | 22560 | RUN: <u>3</u> POSITION: <u>12"</u> |
| 2000 | 2015 | 45990 | 4 |
| 3000 | 3011 | 69360 | 4 |
| 4000 | 4009 | 92850 | 4 |
| 5000 | 5013 | 116630 | 1 |
| 6000 | 6023 | 140,360 | |
| 7000 | 7013 | 163565 | |
| 8000 | 8016 | 187025 | |
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| | | | Topical Report 204 Revi Attachment 6.7 Page 19 |

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| M M | 1 | | | | | | DOCUMENT | | |
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| | 1 | HYDRA | AULIC | JACK CA | LIBKA | TION | RÉVISION # | | .0 |
| A.A. | 1 | Τŝ | near Re | gression A | Analivei | ż. | SAFETY RELA | TED' | x |
| | 1 | لإبسل | nom 170 | Proproti | muryor | , | NON-SAFETY | <u> </u> | |
| Ricigion Surveillant | 1 | | | | | | PAGE | 2 OF | 3 |
| Corporation. | CON | IPUTED BY: | DJM | DATE: | 11/03/10 | REVIEWED BY: | BAG | | 1/03/10 |
| | | | | | | | | | |
| Project: POST | | | | | | | act No: <u>N106</u> | 3 | |
| Jack Description: | | AGNUS | 1 | Size: | <u>1000</u> Tor | en liter v iter viter | ler No: 9400 | | , , , , , |
| Theoretical Ram Ar | | | . in. | De states Max | CALOF. | | ressure: 8500 | psi | |
| Calibrating Device L | | MOREHOU | JSE | Register No: | 61195 | Const | | the second second second second second second second second second second second second second second second s | |
| Calibrating Gauge L | Jseo: | HEISE | | Register No: | 44084 | Due D | ate: 07/28 | /12 | ······································ |
| | Act | ual Gauge Readir | ng (psi) | Load Ce | ell Readout | Compute | d Force (kips) | | |
| | | 1015 | | 228 | 365.00 | 22 | 8.721 | | |
| | | 2017 | | 462 | 275.00 | 46 | 2.893 | | |
| | | 3015 | | | 45.00 | | 7.666 | 4 | |
| | | 4016 | | | 110.00 | | 4.390 | | |
| | | 5011 | | | 900.00 | | 69.362 | - | |
| | | 6022 | | | 780.00 | | 08.236 | _ | |
| | | 7026 | | | 445.00 | | 44.960 | _ | |
| | | 8034 | | | 060.00 | 5 A. | 81.183 6.270 | - | |
| | | 2013 | | | 05.00 | | 1.193 | | |
| | | 3012 | | | 40.00 | | 6.616 | -1 | |
| | | 4010 | | 11. 34.6 | 70.00 | | 1.989 | | : |
| ÷ | | 5007 | | | 710.00 | | 1167.462 | | |
| | | 6009 | <u></u> | | 210.00 | | 02.535 | -1 | |
| | | 7012 | | 163 | 735.00 | | 37.858 | - | |
| · | | 8012 | | 187 | 315.00 | 18 | 73.731 | | |
| | | 1010 | | 225 | 60.00 | | 5.670 | | |
| | | 2015 | | | 90.00 | | 0.043 | | |
| | | 3011 | | | 60.00 | | 3.815 | _ | |
| | | 4009 | | | 50.00 | | 8.788 | | |
| است ا | | 5013 | | | 630.00 | | 36:662 | _ | |
| | | 6023 7013 | | | 360.00 | | 04.035 | _ | |
| | | 8016 | | | 565.00 025.00 | A ** | 36.157 70.830 | - | |
| | | | | 10/1 | 525.00 | 10 | 10.000 | ~ | |
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| | | | | | | | | | |
| | | * Indicates t | hese readin | gš have been o | mitted from | thefinal computation | ns. | a anatar a | |
| Êrr | ors In Ja | ack Calibration | | | | | | | |
| | | | rd | ····· | | | 0.0100 ks | 1 | |
| | | Interpolation in | Gauge | | | | 0.0000 ks | i | |
| | | Accuracy of Ga | uge: | | , | | 0.0000 ks | ŧ. | |
| Em | ors in G | auge Calibration | | | | | | | |
| | | | | | | | | l . | |
| | | | - | · · · | • | | | i | |
| | | | | | | | | | |
| | | | | | | | . 0.0275 ks | i. | |
| Em | ors In Fi | eld Use of Gauge | | | | | | | |
| | | Interpolation Er | ror | | ••••• | | 0.0050 ks | | |

ksi Maximum Gauge Reading Used...... 8.0340 ksi

FORCE (kips) = 235.377 (in²) X GAUGE READING (ksi) + -12.166 (kips)

| Correlation = 0.99999425 | | | lot < 0.66667) |
|------------------------------|--------|--------|--------------------------------|
| Maximum Error Ratio In Jack | | 0.0087 | |
| Maximum Error Ratio In Gauge | | 0.0052 | Topical Report 204 Revion 0 |
| Maximum Total Error Ratio | •••••• | 0.0102 | Attachment 8.7 Page 192 of 523 |

| | <i>w</i> . | | <u> </u> | | li | DOCUMENT NO |): | - | |
|--|--|--------|--|-------------|---------|--|-----------|------|--------|
| | HYDRAULIC JACK CALIBRATION Comparison With Previous Calibration | | | | | DOCUMENT TYPE: | | | ENG |
| A A | | | | | | REVISION # | | | |
| XºX | | | | | | AFETY RELAT | ËĎ. | | X |
| | | | | | [i | ION-SAFETY R | ELATED | | |
| Receipton Surveillances Corporation | | | | | [| PAGE | 3 | OF | 3 |
| | COMPUTED BY: | DJM D | ATE: 11/03 | B/10 REVIEW | /ED BY: | BAG | DATE | : [] | /03/10 |
| Project: POST | TAAI | | · · · · · · · · · · · · · · · · · · · | | Canina | t No: N106 | à | | |
| FIDECI. FUST | I IVII | | | | Contrac | 100.1100 | بربر | | |
| Jack Description | | | Size: 1000 | Tons | | r No: <u>9400</u> | | | |
| Jack Description | MAGNUS | q. in. | Size: <u>1000</u> | Tons | Registe | | | psi | Â |
| | n: <u>MAGNÚS</u> n Area: <u>235.62</u> so | q. in. | Size: <u>1000</u> jister No: <u>6</u> 1 | | Registe | r No: <u>9400</u> essure: <u>85</u> | 00 31 | psi | ~ |

Data From Current CalibrationArea (A_f):235.377 sq.in.Constant (C_f):-12.166 klpsMax Pressure (P):8500 psi

Data From Previous Calibration

Area (A_i): 235.787 sq.in. Constant (C_i): -6.961 kips

$$\frac{i-f}{i} x 100\% = 0.435\%$$

WHERE:

 $i = (A_i \times P) + (C_i * 1000)$

 $f = (A_f \times P) + (C_f * 1000)$

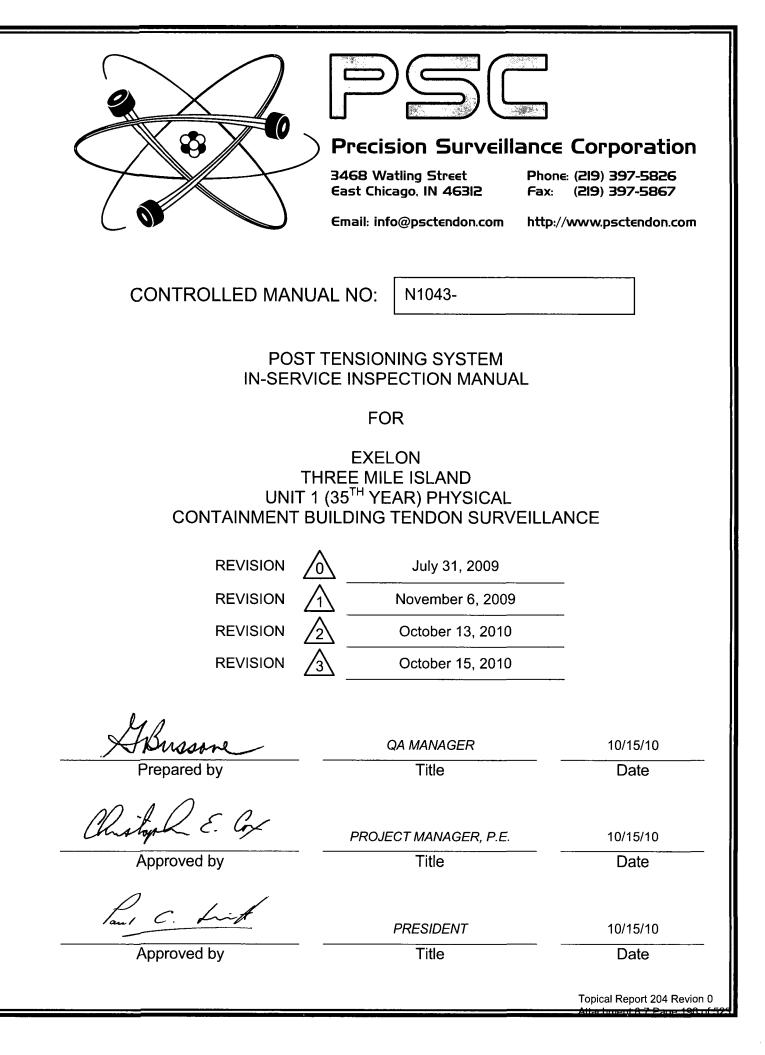
| | | | Number | | |
|---|---|-----------------------------------|------------------|--|--|
| | | TMI - Unit 1 illance Procedure | 1301-9.1 | | |
| Title | | | Revision No. | | |
| RB Structural Integrity Tendor | n Surveillance |) | 21 | | |
| | DATA | SHEET 13 | Page 1 of 1 2 | | |
| Revi | Review / Acceptance of Contractor Procedures | | | | |
| Procedure Number / Title | Revision | Reviewed/Accepted by | Date | | |
| 31.0/ CERSONNEL SAFETY | 0 | Idaa De | 1900010 | | |
| 01.0/SURVEILLANCE PURPOSE | 0 | 7-laver the | - 19 Oct 10 | | |
| 620/SURVELLANCE (CORE I CONSTRUCTION | <u> </u> | 7/agan | 19 Oct 10 | | |
| 103.0/ GOULPMENT LIST COURLITY CONTROL | 0 | Hart | <u>19 00010</u> | | |
| 1 4.0/ EQUIPMENT LIST INSPECTION ME- | 0 | - HAVANTEL | 7 19 00 10 | | |
| 5.0 REQUISITE CHECKLIST | |] Avert | 1900-10 | | |
| 6.6.0 GREASE CAR KENOVAL | | Planate | <u> </u> | | |
| 6.6.1/INSPECT FOR WATER WATER SAMPLE | | Jung | <u>19 000 10</u> | | |
| 66.2/ ANALYSIS SHEATNING | | - Harge FC | <u> 1900-10</u> | | |
| 67.0/ FILLER ANALYSIS ITMEND MEASUREMENT | | T last | 19 00-10 | | |
| 27.1/ OF ANCHORAGES | | Hard | 20 Oct 10 | | |
| Q. 9.1/ Chesmess Fonces | | Flavorth | 20 00-10 | | |
| 210.2 TESTWIRE (CEMONAL TESTING | | - Havanty | <u>20 Oct 10</u> | | |
| 210.3/TENDON WIRES | | - ANON TO | 20 Oct 10 | | |
| Q 10.5/CONTINUITY/EST | | Havent | - 20 OCT 10 | | |
| 12/11/ ENGINEERING DATA | | - Havant H | - 20 Oct/0 | | |
| Q 2.0 / REPLACEMENT | <u> </u> | flag file | 20 00-10 | | |
| CO. 12. 1/ REPLACEMENT | | - Hawarter | 20 Oct 10 | | |
| SQ 12.2 Grease Vaunes | | -HAVONTO | 20 OCT 10 | | |
| QALO/PROGRAM PURPOSE | | f. lasa | 20 Oct 10 | | |
| COAZO/ (ROGRAM SORE | | - Flavorte | 20 000 10 | | |

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| | | | Number | | | |
|--|---|------------------------------------|---|--|--|--|
| | | TMI - Unit 1 iillance Procedure | 1301-9.1 | | | |
| Title | <u></u> | | Revision No. | | | |
| RB Structural Integrity Tendo | n Surveillance | 9 | 21 | | | |
| | DATA | SHEET 13 | Page 1 of 1 1 10 10 | | | |
| Revi | Review / Acceptance of Contractor Procedures | | | | | |
| Procedure Number / Title | Revision | Reviewed/Accepted by | Date | | | |
| QA 3.0/ ORGANIFATION | 0 | 7-lava 7 | 20 Oct 10 | | | |
| (OA 4.0/ RESPONSIBILITY / CERSONNEL | 0 | 7/10/202 | 20 00010 | | | |
| QA4.1 /QUALIFICATIONS / CERSONNEL | / | Haronto | 20 Oct 10 | | | |
| QASO TRAINING | | Hasant | <u>20 Oct 10</u> | | | |
| OAGO/(ROCUREMENT | 0 | flavar the | $\frac{200 \text{cr}/0}{200 \text{cr}/0}$ | | | |
| QA 8.0/ CONTROL | 0 | -f-lavar f | <u>20 OCT 10</u> <u>20 OCT 10</u> | | | |
| QAS. REVISION CONTROL | <u>0</u> | Harright | $\frac{20 0 0 70}{20 0 0 10}$ | | | |
| QA 9.0 NONCONFORMANCES | 0 | Marcul 2 | 20 Oct 10 | | | |
| OA10.0 / CALIFRATION | | Hand | 20 000 10 | | | |
| QAIDI VERIFICATION GUNLITY CONTROL | 0 | Hava H | 20 Oct 10 | | | |
| QALLO/ INSPECTION | 0 | Flavor P | 20 Oct 10 | | | |
| OA12.0/AUDITS | 0 | flaward 10 | 10 ACT 10 | | | |
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| | TENDON SURVEILLANCE PROGRAM ACKNOWLEDGEMENT OF RECEIPT FORM July 31, 2009 Page 1 of 1 Revision 0 Revision 2, 10/13/10 Revision 3, 10/15/10 |
|---|--|
| This page shall be removed, and mailed or Precision Surveillance Cor Quality Assurance 3468 Watling Street East Chicago, IN 46312 | |
| The return of this Acknowledgement form from Conwill indicate acknowledgement-of-receipt for document or otherwise provide similar acknowledgement, SH, status of this manual. RETURN OF THIS FORM DOES NOT CONSTITUTION If this page is stamped "UNCONTROLLED MANUA | ent control purposes. Failure to return this page ALL be just cause for terminating the controlled TE APPROVAL OF THE CONTENTS HEREIN. |
| For more information regarding responsibility of the attendant of this manual, refer to the Manual Control Policy Statement. | eceipt: Name: nature: Title: npany: EXELON roject: TMI 35 TH YEAR TENDON SURVEILLANCE AND 2010 AUGMENTED SCOPE ntract: N1043 & N1063 |
| In-Service Inspection ManualIssue Date07/31/09Revision310/15/10 | |



TENDON SURVEILLANCE PROGRAM MANUAL CONTROL POLICY July 31, 2009 Page 1 of 2 Revision 0

| THRE UNIT 1 (35 | EXELON E MILE ISLAND TH YEAR) PHYSICAL DING TENDON SURVEILLAN(| CE |
|--------------------|--|------------------|
| IN-SERV | VEILLANCE CORPORATION VICE INSPECTION EVEILLANCE PROGRAM | |
| MANUAL | CONTROL POLICY | |
| Mr. (Barrows | Q.A. MANAGER | 07/31/09 |
| Prepared by | Title | Date |
| P.A.D.E.P. | PROJECT MANAGER, P.E. | 07/31/09 |
| Approved by | Title | Date |
| Approved by | PRESIDENT Title | 07/31/09 Date |
| | | |



- **1.0** Controlled copies of this manual SHALL be submitted for review and approval according to the distribution and quantity requirements established by the Contract Documents. Where this is not specified, Precision Surveillance Corporation SHALL submit a minimum of one controlled Manual. Where applicable, an uncontrolled copy may be submitted to assist in the review process. To avoid fabrication or construction delays, a line of communication should be established with the personnel responsible for initiating approval for the Manual or Revisions thereto, rather than incurring the delay for gravitation to that level.
- 2.0 Acknowledgement of Receipt is mandatory upon receiving a Controlled Manual and a form is supplied to facilitate this response. This form or a copy, SHALL be filled in with the information requested and returned in order to activate the Control status of this Manual, otherwise it will be treated as an uncontrolled manual and no attempt SHALL be made to keep it in a current condition.
- **3.0** The responsibility for keeping the uncontrolled Manuals up to date SHALL be incumbent on the person acknowledging receipt of the Controlled Manual.
- **4.0** Reproduction of the Manual <u>IS NOT AUTHORIZED</u>, except for copies made by Exelon for internal distribution review and use, without the expressed written consent of the Precision Surveillance Corporation Quality Assurance Section responsible for the maintenance of the Manual.
- **5.0** Where required, uncontrolled manuals SHALL be submitted at the pre-bid stage of the project. In the event of non-award of the project to Precision Surveillance Corporation, the uncontrolled Manual SHALL be returned to the Quality Assurance Section.

6.0 INTERNAL

6.1 Those Precision Surveillance Corporation personnel receiving Controlled Manuals or revisions thereto, SHALL be responsible for reviewing and understanding those portions of the Quality Program that they and their subordinates are responsible for. The return of the Acknowledgement of Receipt SHALL constitute certification that the person receiving that Program/Revision has reviewed the contents and has taken appropriate action to notify or train those personnel under his control that are affected by that document or the revisions thereto.



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EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION **IN-SERVICE INSPECTION TENDON SURVEILLANCE PROGRAM**

DEFINITIONS

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

Title

PRESIDENT

Title

Prepared by

Approved by

Approved by

07/31/09

07/31/09

Date

Date

07/31/09

Date

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<u>ACTIVE CORROSION:</u> Corrosion on a component that exhibits metal loss that has occurred since fabrication or construction, and/or exhibits pitting visible to the naked eye. Active corrosion usually is a reddish/rust color.

ANCHORHEAD (Stressing Washer): The round machined components at the end of each end of the tendon through which tendon wires are passed.

<u>BEARING PLATE (Baseplate, Trumplate)</u>: The steel plate at the end of the tendon, embedded in the concrete. The tendon is passed through the hole in the plate and the anchorhead bears against the plate or shim which in turn transfers the load to the concrete.

<u>BROKEN WIRE:</u> A wire within a tendon assembly that is broken and not capable of accepting post tensioned load. Wires that excessively protrude from the anchorage components are suspected to be broken.

<u>BUTTONHEAD</u>: The end of the tendon wire that was mechanically deformed during construction, which seats on each anchorage.

<u>CONTINUITY TEST</u>: A method of determining if wires are intact and not broken within a tendon. This is an optional test that may be recommended as a corrective action if abnormal degradation is identified.

<u>CORROSION PROTECTION MEDIUM (Grease, Casing Filler)</u>: Grease injected into tendon duct and anchorage caps for corrosion protection. Also referred to as grease or sheathing filler grease.

EFFECTIVE WIRE: Tendon wire capable of maintaining required post tensioned force.

ELONGATION: The distance a tendon/wire stretches while under stress.

<u>FEELER GAUGE METHOD</u>: The method used to determine lift off during a test that utilizes the placement of feeler gauges within the anchorage components while the tendon is under jack/ram load.

<u>FIELD END</u>: The end of the tendon on which buttonheads are formed after the tendon is installed. The field end usually does not have a bushing.

<u>FREE WATER:</u> Any quantity of water collected from a tendon grease cap, anchorage components, shim gaps, or tendon duct.

<u>GREASE CAP</u>: Steel container bolted to the bearing plate or anchorhead. A grease cap encases the anchorage assembly to provide permanent corrosion protection.



<u>GUARANTEED MINIMUM ULTIMATE TENSILE STRENGTH (GUTS)</u>: The tensile strength of the tendon assembly based upon the tensile strength of the wire used in construction and the quantity of effective wires. The minimum Guaranteed Ultimate Tensile Strength of 0.250 inch (6.35 mm) diameter wire is 240,000 pounds per square inch or 11,781 pounds per wire.

<u>INSPECTION PERIOD</u>: The period in which an inspection is completed at a specific site.

<u>JACK (Ram)</u>: A cylindrical, hydraulic piston used to stress the tendon. Also referred to as a "Ram".

<u>JACK CHAIR</u>: That device attached to the front of the ram and bears against the bearing plate, which provides the lift height for the tendon as it is being stressed.

<u>LIFT OFF FORCE</u>: The actual force or pressure required to lift the anchor head off the tendon anchorage assembly shim stack.

<u>LOCK OFF FORCE</u>: The final seating force of a tendon after tensioning during construction or retensioning thereafter.

<u>MINIMUM DESIGN FORCE (kips)</u>: The minimum acceptable average prestress force for a tendon or group of tendons to maintain the design basis of the containment structure.

MISSING WIRE: A wire that is identified as missing from the tendon.

<u>MONITORING OF FORCE</u>: That series of operations that determine the force or prestress remaining in the tendon.

<u>NET DUCT (GREASE VOID) VOLUME:</u> The volume within a tendon duct that is capable of being filled with corrosion protection medium. This is the gross duct volume minus the volume taken by the tendon wires and components.

<u>OVERSTRESS FORCE</u>: The maximum force that can be applied to a tendon during lift off testing and retensioning. This force is 80% of the tendon's ultimate tensile strength. For wire specification ASTM A421, 80% of the minimum Guaranteed Ultimate Tensile Strength of the wire is 9,423 pounds for each 0.25 inch diameter wire.

<u>POST TENSIONING</u>: A method of prestressing concrete in which the tendons are tensioned after the concrete has cured.



<u>PREDICTED FORCE:</u> The pre-calculated force (in kips) based upon the measurement of the prestressing forces during installation minus the losses in prestressing forces that were predicted to have occurred since that time because of material and structural characteristics. This is the calculated minimum force that should be achieved during lift off. This value is the acceptance criteria for measuring pre-stress forces. The as-found value should be equal to or exceed this value.

<u>PRESTRESSED CONCRETE</u>: Reinforced concrete in which internal stresses have been introduced in such magnitude and distribution that the stresses resulting from loads are counteracted to a desired degree.

<u>PRETENSIONING FORCE</u>: The force achieved during retensioning where the slack and mechanical clearances have been removed.

<u>PROTRUDING OR UNSEATED WIRE</u>: A wire within a tendon assembly that is extending beyond a tendon anchorhead face after stressing and is not seated against the anchorhead. The wire must be evaluated.

<u>PUMP:</u> A mechanical device used to pump hydraulic fluid into the jack and apply the force required to stress the tendon.

RAM: Synonym for Jack. (See Jack)

<u>REGRESSION ANALYSIS:</u> The determination, based upon evaluation of measured forces, of the capability of a tendon or group of tendons to maintain the minimum design prestress force(s) until the next scheduled inspection or beyond.

<u>RESPONSIBLE ENGINEER</u>: A Registered Professional Engineer (RPE) experienced in evaluating the in-service condition of structural concrete. The RPE shall have knowledge of the design and construction codes and other criteria used in the design and construction of concrete containment structures in nuclear power plants.

<u>SHEATHING (Conduit, Duct)</u>: The thin-walled tubular steel used for creating a void in the concrete through which the tendon is passed. (Also referred to as : duct, conduit.)

<u>SHIM STACK:</u> A series of steel shims installed between the anchor head and bearing plate so that the desired prestress force is obtained.

<u>SHOP END:</u> The end of a tendon on which the buttonheads are formed prior to installation. These buttonheads are formed in a shop environment and not in the field.

<u>STRESSING</u>: Connecting the ram to the tendon and pulling until a predetermined force and elongation is achieved.

<u>STRESSING ADAPTOR (Coupler)</u>: That threaded device attached to the pull-rod of the ram, which couples with the anchorhead to be stressed.



<u>TENDON:</u> A separate continuous multi-wire tensioned element anchored at both ends to an end anchorage assembly. An assembly of prestressing steel and anchorage components which imparts prestressing forces to concrete.

<u>TENDON END ANCHORAGE ASSEMBLY:</u> That portion of the tendon which extends beyond the bearing plate while in a stressed condition which consists of the bearing plate, shim stack, anchor head and wire.

<u>TENDON GROUP (TYPE)</u>: Groups based upon geometry and position in the containment structure. Horizontal, vertical, and dome tendon groups are applicable to TMI Unit 1.

<u>TENDON LOCATION NUMBER</u>: The identity of a tendon with regard to it's location in the structure.

WIRE: 0.250 inch (6.35 mm) diameter wire manufactured to ASTM A421.



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

PERSONNEL SAFETY

erald Busson

PROJECT MANAGER, P.E. Title

Q.A. MANAGER

Title

PRESIDENT Title

07/31/09 Date

07/31/09

Date

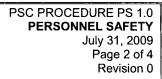
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Approved by

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1.0 PURPOSE

1.1 The purpose of this document is to create an awareness for those safety considerations that must be observed by personnel working around or directly involved in Post-Tensioning System operations.

2.0 GENERAL

2.1 All personnel directly involved with the Post-Tensioning System operations shall be made aware of the magnitude of the working forces and safety requirements for the various operations.

3.0 SAFETY

- 3.1.1 <u>WIRE</u>
- 3.1.2 The wire used for fabricating the tendons has a minimum breaking strength of 240,000 pounds per square inch. This means that each ¼" diameter wire is capable of withstanding a minimum breaking load of 11,781 pounds. Multiply this by the number of wires in a tendon and you are dealing with forces of almost 2 million pounds for a 169 wire tendon.

NEVER CONNECT A WELDING GROUND, PERFORM WELDING ON, OR STRIKE AN ARC NEAR A STRESSED TENDON.

NEVER APPLY AN OPEN FLAME TO THE BUTTONHEADS, THE WIRES OR ANCHORHEADS OF A STRESSED TENDON.

NEVER STRIKE THE BUTTONHEADS, THE WIRES OR THE ANCHORHEADS OF A STRESSED TENDON WITH A HAMMER OR ANY OTHER OBJECT.

- 3.1.3 The above actions could cause a button head or wire to fail. During tendon tensile testing, broken wires or button heads have been observed to penetrate hard lumber in excess or 4 inches in thickness, about the equivalent of a .32 caliber bullet.
- 3.2 STRESSING OPERATIONS
- 3.2.1 During de-tensioning or stressing operations the following cautions shall be observed.

NEVER EXCEED THE OVERSTRESS FORCE OR PRESSURE - 80% OF TENDON GUTS FOR THE AMOUNT OF EFFECTIVE WIRES IN A TENDON. (1592 kips FOR A 169 WIRE TENDON.)



DO NOT STAND BEHIND THE JACK WHEN IT IS UNDER LOAD. KEEP FINGERS OUT OF ANY PINCH AREAS. BE ALERT DURING SHIM PLACEMENT AND REMOVAL.

3.3 STRESSING ADAPTOR (COUPLER)

- 3.3.1 Prior to applying ANY FORCE to the tendon, the stressing adaptor, coupler, must be fully engaged with the anchorage to be stressed or de-tensioned. No more than 3/8 of an inch of the anchorage shall protrude beyond the bottom face of the stressing adaptor, to constitute full engagement.
- 3.3.2 During coupling and uncoupling of the stressing adaptor with the bushing and the small anchor head, and especially where some difficulty is encountered with the actual coupling, there is a possibility that the small anchor head may become partially or completely unthreaded from the bushing. Therefore, where any difficulty has been encountered in coupling the adaptor to any anchorage, especially where repeated thread-on and unthreading is noted, before any load or jacking force is applied to that tendon, the proper engagement of the shop anchor head to the bushing shall be checked. This shall be done visually verifying that the small anchor head does not protrude beyond the bottom face of the bushing. The uncoupling could occur as a result of tight, sticking or slightly damaged threads.

3.4 **GREASING OPERATIONS**

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

- 3.4.1 During greasing operations the grease may be pumped under pressure and will have temperatures in excess of 200°F and injury could occur through carelessness. It is therefore essential to avoid direct contact with the hot grease and to make sure all connections are secure.
- 3.4.2 Exercise caution when climbing ladders. The potential for slippery surfaces created by grease on shoes exists. Ladder rung, etc. shall be wiped clean if coated in grease.
- 3.4.2.1 During heating of grease be aware that belt heaters are hot and could cause injury if touched. It is also essential to ensure that no flammable materials are allowed to touch belt heaters when in operation.



3.4.2.2 Belt heaters draw large amounts of current, ensure that power supply and any extension chords used are suitable for the power requirements.

3.5 CONSTRUCTION SAFETY

DO NOT STAND UNDER LOADS WHILE STATIONARY OR DURING HOISTING. DO NOT PERMIT OTHERS TO STAND UNDER LOADS. DO NOT THROW OR DROP OBJECTS FROM THE SCAFFOLD.

- 3.5.1 All Exelon Accident Prevention Procedures shall be rigidly adhered to, to the total satisfaction of the site safety department. As in other heavy construction, care should be exercised while working from scaffolds, platforms, ladders, high or restricted access locations. Respect for the safety and well-being of the other trades and personnel in the area must be observed, especially during hoisting operations.
- 3.5.2 Some work may be near plant equipment required for safe shutdown and/or may cause shutdown if plant equipment is damaged. Use special care therefore when suspending or moving de-tensioning rams or other heavy surveillance equipment.
- 3.5.3 If required notify site safety organization to obtain air samples in the tendon gallery prior to entry into the gallery. Enter gallery only upon site safety approval.
- 3.5.4 If there are any doubts or questions concerning a point of operation or safety, refer to the PSC Construction Supervisor before starting that operation or proceeding any further. Refer to the Quality Control personnel any questions about quality before starting operations or proceeding any further.
- 3.5.5 For surveillances during plant operation, special precautions must be taken to avoid work in hazardous areas resulting from plant operating conditions.



PSC PROCEDURE SQ 1.0 PURPOSE July 31, 2009 Page 1 of 2 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

SURVEILLANCE PURPOSE

Terald Busso Prepared by

Approved by

pproved by

PROJECT MANAGER, P.E. Title

PRESIDENT Title

Q.A. MANAGER

Title

07/31/09

07/31/09

Date

07/31/09

Date

Date



1.0 PURPOSE

- 1.1 The Purpose of the Tendon Surveillance Program is to demonstrate the integrity of the containment pre-stressing system, including containment tendons, tendon end anchorage hardware and adjacent concrete integrity, and evaluation of the corrosion protective (grease) system. Individual inspections of selected tendons, as well as grease sample testing are performed to evaluate the overall integrity of the pre-stressing system.
- 1.2 Tendon surveillance is required at 1, 3, 5, and 10 years after the Initial Containment Structural Integrity Test and is to be performed every 5 years thereafter for the life of the plant.
- 1.3 The purpose of this Surveillance Quality Control Manual is to provide those procedures that will be necessary to perform the Unit 1 Physical 35th Year In-Service Inspection (Surveillance) of the Reactor Building Post-Tensioning System Tendons for Exelon's Three Mile Island Nuclear Plant.
- 1.3.1 The surveillance must conform to the requirements of TMI Procedure 1301-9.1.
- 1.3.2 The SQ procedures provide additional detailed instructions for certain surveillance activities.
- 1.3.3 In the event of conflict between 1301-9.1 and an SQ, the former governs.
- 1.3.4 Procedures shall be used as shown in PSC Procedure SQ 2.0.
- 1.3.5 In addition, each procedure provides as necessary, the reporting responsibilities for PSC Personnel for notification to TMI Engineering in writing of unacceptable conditions that may have been detected as a result of the Inspections, Tests or Evaluations.
- 1.4 It shall be the responsibility of Exelon to evaluate the seriousness of the unacceptable condition and to formulate, with the assistance of the PSC Engineering Department as required, or if needed, a means of corrective action.
- 1.4.1 It shall further be Exelon's responsibility to draft and submit a formal report to the United States Nuclear Regulatory Commission describing the unacceptable condition and the required corrective action.
- 1.5 This Surveillance Quality Control Manual has been developed in accordance with Exelon's Procedures 1301-9.1 Rev 20, ER-AA-335-018 and ASME Section XI, Subsection IWL, 2001 Edition with 2003 Addenda and the applicable amendments as specified in 10CFR50.55a, Codes and Standards.



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| IN-SER' | PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE | | | | | | | |
| SURVE | EILLANCE SCOPE | | | | | | | |
| Prepared by | QA MANAGER Title | 10/13/10 Date | | | | | | |
| Chityph E. Cox Approved by | PROJECT MANAGER, P.E. Title | 10/13/10 Date | | | | | | |
| Approved by | Title | 10/13/10 Date | | | | | | |



1.0 CONTAINMENT ARRANGEMENT

- 1.1 The Three Mile Island Unit 1 containment building is a post-tensioned and reinforced concrete structure comprised of a vertical cylinder with hemispherical dome roof. It is supported on a conventional reinforced concrete foundation slab. The containment structure post-tensioning systems provide sufficient external pressure load to balance the internal pressure of the structure as well as the design basis accident internal containment pressure. The post-tensioning system consist of:
- 1.2 Approximately 166 vertical tendons in the cylinder walls anchored at the top surfaces of the ring girders and at the bottom of the base slabs;
- 1.3 Approximately 330 hoop tendons in the cylinder wall. Each tendon encloses 120 degrees of arc and is anchored at two of the six vertical buttresses;
- 1.4 Three groups of 49 dome tendons (total 147 tendons) alternately oriented at 120 degrees to each other and anchored at the vertical faces of the ring girders.
- 1.5 Each tendon consists of nominally 169 ¼" diameter high strength wires with buttonhead anchorages. The vertical and hoop tendons are housed in individual spirally wrapped, corrugated, thin wall sheet metal sheathing connected to steel bearing plates and trumplets at each end. The dome ducts are 5" schedule 40 pipe. The sheathing (pipe) is cast into each containment structures' concrete walls and dome. The tendons are capped at each anchorage with a sheathing filler cap and the tendon sheathing and caps are filled with corrosion preventing grease.

2.0 UNIT 1 SCOPE OF WORK

1

- 2.1 The required Inspections, Testing and evaluation of the Post-Tensioning System of Exelon's Three mile Island Nuclear Plant Unit 1 during the 35th Year surveillance, and additional SGR scope, shall be performed for the tendons (selected by TMI Engineering) and types of activities shown in table Table 2-1.
- 2.1.1 The surveillance must conform to the requirements of TMI Procedure 1301-9.1.
- 2.1.2 The SQ procedures provide additional detailed instructions for certain surveillance activities.
- 2.1.3 In the event of conflict between 1301-9.1 and an SQ, the former governs.

PSC PROCEDURE SQ 2.0 SURVEILLANCE SCOPE July 31, 2009 Page 3 of 3 Revision 0 Revision 1, 10/13/10



| END T1 & BT3 | SG6.0 | ତେତ୍ତ୍ୟ | SOT.O | (]o | ଝ୍ୟ | ତ୍ତ | | | |
|------------------------|--|---|---|---|--|---|---|---|---|
| T1 & BT3 | 100 C 100 C | Q | S | 13010- 0.1 | SCH0.2 | ତେଶାପ୍ତର | <u>(</u> 180%)∈ ଥିନୀ | ତ୍ତରୀ2.1 | COMMENTS |
| | | | | | | | | • | |
| T2 & BT4 | ٠ | • | ٠ | • | | | | • | |
| T4 & BT6 | • | • | • | • | | | | • | |
| T1 & BT5 | • | • | • | • | • | • | • | • | DETENSION |
| T2 & BT6 | • | | • | • | | | | • | COMMON |
| 5 - 1 | | | | | | | | | a Tariha da Angela d Angela da Angela da An |
| TOP/BOT | • | | • | • | | | | • | |
| OP/BOT | | | | • | • | | | • | COMMON |
| FOP/BOT | • | • | • | • | • | • | • | ٠ | DETENSION |
| OP/BOT | | • | • | • | | | 11111111111111111111111111111111111111 | • | |
| NE & SW | • | • | • | • | | · | p · · · · | • | |
| WW & SE | • | • | • | • | | | | • | COMMON |
| W & SE | • | • | • | • | ٠ | • | | ٠ | DETENSION |
| 1W & SW | • | • | • | • | | | | • | COMMITMENT FROM 30 TH YEAR |
| | T1 & BT5 T2 & BT6 OP/BOT OP/BOT OP/BOT OP/BOT JE & SW JW & SE JW & SE JW & SE | T1 & BT5 T2 & BT6 OP/BOT OP/BOT OP/BOT OP/BOT OP/BOT UE & SW UW & SE IW & SE OP | T1 & BT5 • T2 & BT6 • OP/BOT • OP/BOT • OP/BOT • OP/BOT • OP/BOT • IV • IV SE IW SE IW • IW SW IW • | T1 & BT5 • • • T2 & BT6 • • • T2 & BT6 • • • OP/BOT • • • IV & SE • • • IW & SE • • • IW & SW • • • | T1 & BT5 • • • T2 & BT6 • • • OP/BOT • • • VOV • • • OP/BOT • • • OP/BOT • • • OP/BOT • • • OP/BOT • • • VE & SW • • • JE & SW • • • JW & SE • • • JW & SW • • • | T1 & BT5 •< | T1 & BT5 •< | T1 & BT5 •< | T1 & BT5 •< |

| | Table 2 | 2-2a : | : TMI | - A | dded | SGR | l Sco | ope – | Sur | veillance Tendons Unit 1 |
|--------|-----------|--------|-------|-------|--------------|-------|----------|----------------------------|----------|--------------------------|
| TENDON | | V | ISU/A | YL |) F | HYE | AOIE | L · | | |
| | end | ଟେଇଣ | ଟେଡିମ | SOT.0 | 1301- 9.1 | SM0.2 | ତ୍ରେପ୍ତି | (130) - ଇନ୍ମ | ତ୍ତଶାହ୍ୟ | COMMENTS |
| H46-39 | BT4 & BT6 | • | • | ٠ | • | • | • | • | • | DETENSION |
| H46-41 | BT4 & BT6 | • | • | • | • | | | | • | |
| V-118 | TOP/BOT | | • | | • | 5 | • | γ [™] € \$7 | | DETENSION |
| V-134 | TOP/BOT | • | • | • | . • | | | | • | |

3.0 EXPLANATION

1

3.1.1 "V" are Vertical Tendons, "H" are Hoop Tendons and "D" are Dome Tendons.

3.1.2 "•" - means the tendon shown shall be Inspected for the stated requirements during this Surveillance.



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE PRECISION SURVEILLANCE CORPORATION **IN-SERVICE INSPECTION** QUALITY CONTROL PROCEDURE CONSTRUCTION EQUIPMENT LIST Ierald Bussone Prepared by Q.A. MANAGER 07/31/09 Title Date PROJECT MANAGER, P.E. 07/31/09 Approved by Title Date PRESIDENT 07/31/09 Title Date Approved b



1.0 EQUIPMENT

- 1.1 The following list of equipment should be available for use during the Surveillance operations. This list is only intended as a guide.
- 1.2 Miscellaneous shackles, hooks, chain hoists, Come-A-longs, hoisting slings.
- 1.3 Banding equipment.
- 1.4 Communications equipment Walkie Talkies or Sound Powered Phones.
- 1.5 Buckets, pails, rags, brushes.
- 1.6 Miscellaneous Tools, hammers, wrenches, ratchets, sockets, bundling wire, screw drivers, pliers, heavy duty wire cutters, files, pry bars, etc.
- 1.7 Miscellaneous nuts, bolts, pins, washers, wooden blocks, rags, lights, extension cords, tape, etc.
- 1.8 Platforms, scaffolding, ladders, man-lifts, cable, ropes, etc.
- 1.9 Plastic Bags, Plastic Sheeting (Visqueen).
- 1.10 Band or Drum heaters.
- 1.11 Fluid Pump for drum.
- 1.12 Empty 55 Gallon drums.
- 1.13 Grease can gaskets.
- 1.14 55 Gallon drums of Viscosity Oil Visconorust 2090P-4 (Certified).
- 1.15 55 Gallon drums of Viscosity Oil Viscor #16A Solvent or equal (Certified).



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PSC PROCEDURE SQ 4.0 Q.C. EQUIPMENT LIST July 31, 2009 Page 1 of 3 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

QUALITY CONTROL EQUIPMENT LIST

Prepared by Q.A. MANAGER 07/31/09 Title Date PROJECT MANAGER, P.E. 07/31/09 Approved by Title Date PRESIDENT 07/31/09 Title Date pproved by



1.0 INSPECTION EQUIPMENT

1.1 The following items shall be required for the inspections stated in each procedure. Each piece of testing and measuring equipment shall be in a currently calibrated condition. Items in excess of those shown as being required for that procedure, and being used during the Inspections of that procedure, shall be documented on the appropriate Data Sheet where they were used for: Name, Identification and Recalibration Date.

2.0 <u>SQ 6.0</u>

- 2.1 Surface Thermometer.
- 2.2 Pocket-Probe Thermometer.
- 2.3 Sample of new 2090P-4 grease in a closed container (for Color Match).

3.0 <u>SQ 6.1</u>

- 3.1 Suitable quantities of clean, unused non-metallic containers for obtaining water samples.
- 3.2 Clean unused rags or wipers.
- 3.3 Indelible permanent marking devices and/or labels for the sample containers.
- 3.4 Flashlights and batteries.
- 3.5 Pens; Markers; Data Sheets; Tendon Inspection List.

4.0 <u>SQ 7.0</u>

- 4.1 Suitable quantities of clean, unused 1 quart containers; plastic or steel.
- 5.0 <u>SQ 7.1</u>
- 5.1 Standard Outside Measuring Micrometer capable of reading to 0.001" or better.
- 5.2 Standard Inside Measuring Micrometer capable of reading to 0.001" or better.
- 5.3 Special Pitch Diameter Go and No-Go Thread Plug Gauges.
- 5.4 A set of three hardened standard stub ACME thread wires (diameter 0.129" to 0.162").
- 5.5 Shims, used in the three-wire method of measurement.

PSC PROCEDURE SQ 4.0 Q.C. EQUIPMENT LIST July 31, 2009 Page 3 of 3 Revision 0



| 6.0 | <u>1301-9.1</u> |
|------|---|
| 6.1 | Magnifying Glasses with suitable illumination. |
| 6.2 | Optical Comparator with 0.005" Measuring Reticle. |
| 6.3 | Steel Ruler, Steel Tapeline. |
| 6.4 | 400 Grit Wet or Dry Sandpaper. |
| 6.5 | Steel Wool - Medium Coarseness. |
| 6.6 | Feeler Gauges. |
| 6.7 | Stressing Jacks. |
| 6.8 | Pressure Gauges. |
| 6.9 | Caliper. (Optional) |
| 6.10 | Heise Digital Gauge (Verification of Pressure Gauge Calibration, refer to Procedure QA 10.1). |
| 6.11 | Surface Thermometer. |
| 6.12 | Tendon Wire Pulling Ram. (Optional) |
| 6.13 | 1" O.D. Micrometer. |
| 6.14 | Wire Test Apparatus. |

6.15 Pressure Gauge, if used with the hydraulic pump for the Apparatus.

7.0 <u>SQ 12.1</u>

- 7.1 Surface Thermometer.
- 7.2 Pocket-Probe Thermometer.



PSC PROCEDURE SQ 5.0 PREREQUISITE CHECKLIST July 31, 2009 Page 1 of 2 Revision 0

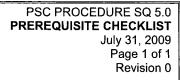
EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE PRECISION SURVEILLANCE CORPORATION **IN-SERVICE INSPECTION** QUALITY CONTROL PROCEDURE **INSPECTION PREREQUISITE CHECKLIST** Q.A. MANAGER 07/31/09 ualil Busson Prepared by Title Date PROJECT MANAGER, P.E. 07/31/09 Approved by Title Date PRESIDENT 07/31/09 au Title Approved b Date

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1.0 CHECKLIST

- 1.1 The following items should be checked prior to beginning work. This is not a Quality Control Documentation requirement and is only presented as a reminder list to those personnel who will be dependent on these items.
- 1.2 Verify that all the Construction Equipment cited in PSC Procedure SQ 3.0 has been prepared or arrangements made for acquisition.
- 1.3 Verify that the Quality Control Equipment cited in PSC Procedure SQ 4.0 has been ordered or is available for use.
- 1.4 Verify that the Grease Testing Laboratory has been qualified and ready to receive the grease samples.
- 1.5 Verify that suitable quantities of the data sheets are available or the means to generate a suitable quantity is available on site.
- 1.6 Verify that controlled copies of the PSC Quality Assurance Manual and the PSC Surveillance Quality Control Manual are available.
- 1.7 Verify that each item supplied as Quality Control Equipment has been calibrated and that suitable documentation accompanies each item.
- 1.8 Verify that all Field Quality Control Personnel are qualified and that copies of certifications exist for each Inspector.
- 1.9 Verify that the Construction Personnel are familiar with the operating manuals for the equipment and that suitable training has been provided to familiarize them with the Surveillance requirements.
- 1.9.1 Verify that the Construction Personnel are familiarized with the Safety Comments for the Surveillance.
- 1.9.2 Verify that the Construction Personnel have been familiarized with the OSHA safety requirements and any selective safety measures imposed by Exelon.
- 1.9.3 Verify that the On-Site Radiological Safety Training requirements have been completed if required.
- 1.10 Verify that the identity and location of each tendon to be inspected is correct.
- 1.11 Verify that suitable quantities of 2090P-4 grease and Viscor #16A Solvent or equivalent are available with the required documentation.





| | | <u></u> | | |
|-------|---|-------------|--------|------|
| ITEM | | STATUS | SIGNED | DATE |
| 1.2 | Verify that all the Construction Equipment cited in PSC Procedure SQ 3.0 has been prepared or arrangements made for acquisition. | ☐ Yes ☐ N/A | | |
| 1.3 | Verify that the Quality Control Equipment cited in PSC Procedure SQ 4.0 has been ordered or is available for use. | □ Yes □ N/A | | |
| 1.4 | Verify that the Grease Testing Laboratory has been qualified and ready to receive the grease samples. | □ Yes □ N/A | | |
| 1.5 | Verify that suitable quantities of the data sheets are available or the means to generate a suitable quantity is available on site. | ☐ Yes ☐ N/A | | |
| 1.6 | Verify that controlled copies of the PSC Quality Assurance Manual and the PSC Surveillance Quality Control Manual are available. | Yes N/A | | |
| 1.7 | Verify that each item supplied as Quality Control Equipment has been calibrated and that suitable documentation accompanies each item. | 🗌 Yes 🗋 N/A | | |
| 1.8 | Verify that all Field Quality Control Personnel are qualified and that copies of certifications exist for each Inspector. | ☐ Yes ☐ N/A | | |
| 1.9 | Verify that the Construction Personnel are familiar with the operating manuals for the equipment and that suitable training has been provided to familiarize them with the Surveillance requirements. | ☐ Yes ☐ N/A | | |
| 1.9.1 | Verify that the Construction Personnel are familiarized with the Safety Comments for the Surveillance. | □ Yes □ N/A | | |
| 1.9.2 | Verify that the Construction Personnel have been familiarized with the OSHA safety requirements and any selective safety measures imposed by Exelon. | ☐ Yes ☐ N/A | | |
| 1.9.3 | Verify that the On-Site Radiological Safety Training requirements have been completed if required. | 🗌 Yes 🗌 N/A | | |
| 1.10 | Verify that the identity and location of each tendon to be inspected is correct. | Yes N/A | | |
| 1.11 | Verify that suitable quantities of 2090P-4 grease and Viscor #16A Solvent or equal are available with the required documentation. | Yes 🗋 N/A | | |



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

GREASE CAP REMOVAL

all Bussen Prepared by

Approved by

Approved b

Title PRESIDENT

Title

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

07/31/09

07/31/09

Date

07/31/09

Date

Date



1.0 PURPOSE

1.1 This procedure will establish the requirements for the removal of Grease Caps (End Caps) for purposes of evaluation and visual inspection during In-Service-Inspection (surveillance) of the Post-Tensioning System Tendons at Exelon's Three Mile Island Nuclear Plant - Unit 1.

2.0 **RESPONSIBILITY**

2.1 As stated in PSC Procedure QA 4.0.

3.0 QUALIFICATION

3.1 As stated in PSC Procedure QA 4.1.

4.0 EQUIPMENT

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

5.0 QUALITY CONTROL

5.1 This procedure contains <u>QCD</u> points. The work shall not progress past or through a <u>QCD</u> without a sign-off or verbal approval from the QC Inspector. All Quality Control Documentation (<u>QCD</u>) 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 6.0.

6.0 **PRECAUTIONS**

- 6.1 A tendon grease cap weighs in excess of 50 pounds and may contain 50 pounds of grease. Be prepared to support this weight when the grease cap is unbolted and removed.
- 6.2 The sheathing filler (grease) may be in liquid, gel or solid form. Tendons in the area of steam or feed penetrations in operating plants, may contain hot grease and some caution should be exercised. It is not necessary to drain all the grease from a tendon void and is to be avoided if possible.

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

HAVE SUFFICIENT QUANTITIES OR SIZES OF CONTAINERS ON HAND TO CATCH THE GREASE, AS IT MAY FALL FROM THE TENDON VOID, ANCHORAGE OR GREASE CAP.



IF AT ANY TIME A CRACKED OR BROKEN ANCHORHEAD IS DETECTED AS A RESULT OF THESE INSPECTIONS, ALL WORK SHALL STOP. ALL PERSONNEL SHALL BE MOVED AWAY FROM THAT AREA. THE PSC CONSTRUCTION SUPERVISOR SHALL BE NOTIFIED. THE CONDITION SHALL BE FORMALLY DOCUMENTED BY A NONCONFORMANCE REPORT. THE WORK AND/OR INSPECTIONS SHALL CONTINUE AFTER A SAFETY EVALUATION HAS BEEN MADE AND ONLY AT THE DIRECTION AND CONTROL OF THE PSC CONSTRUCTION SUPERVISOR AND TMI ENGINEERING.

- 6.3 Provide protection during inclement weather to prevent entry of moisture into the end anchorage.
- 6.4 Use wooden or plastic paddles or spatulas to scoop out bulk filler grease from around the anchorage. No metal implements are permitted.

7.0 PREREQUISITES

- 7.1 Position platforms, as required, at the end of the tendon to be inspected.
- 7.2 **<u>QCD</u>** Document the tendon identification, Unit # and tendon end on Data Sheet 6.0
- 7.3 Provide support for the Grease Cap. Be prepared to catch any grease that may fall during loosening and removal.
- 7.4 It may be advantageous to pack the outside of the grease cap with dry ice to further solidify the grease column. TMI Engineering shall be notified prior to performing any dry ice packing.
- 7.4.1 Once the grease cap has been removed, the tendon end anchorage and shims may be packed with dry ice to further solidify the grease column. TMI Engineering shall be notified prior to performing any dry ice packing.
- 7.5 **<u>QCD</u>** Document the date can removal started on Data Sheet 6.0.
- 7.6 **<u>QCD</u>** Document the use of dry ice to solidify the grease column on Data Sheet 6.0, for each occurrence.
- 7.7 **QCD** Document the ambient temperature as well as the temperature of the concrete surface near the tendon within a 3 foot radius of the center of the grease cap or tendon void, on Data Sheet 6.0. The temperature shall be taken of the normal concrete. It shall not be necessary to take the temperature again, if dry ice is used. Document the thermometer identification number and recalibration due date for each instrument used.



7.8 Care shall be exercised to avoid splashing or spilling grease on concrete and other surfaces. Spilled grease shall be removed and cleaned using Viscosity Oil, Viscor #16A industrial solvent or equivalent, by scrubbing with brushes and wiping the excess with rags. It may be advantageous to tape plastic sheeting around the bearing plate and concrete to lessen the effect of spilled grease.

8.0 REMOVAL OF GREASE CAP

- 8.1 Place a container and/or a protective cover under the tendon grease cap to protect adjacent areas from dripping grease.
- 8.2 Remove the bolts and washers holding the end cap to the bearing plate ensuring that the end cap is fully supported as the bolts are being removed.
- 8.3 Carefully, remove the grease cap to prevent any foreign matter from dropping into the grease in that cap.
- 8.4 **<u>QCD</u>** Detect and record the anchorhead ID#. This ID# should be compared and verified to the original data, providing original data is available.
- 8.5 <u>**QCD**</u> Observe the coating of grease on the inside of the grease cap, on the bearing plate, shims, anchorhead and buttonheads. Note the completeness of the grease coverage on each item and document that evaluation accordingly on Data Sheet 6.0.
- 8.5.1 Where the coverage is complete, check as Complete coverage.
- 8.5.2 Where the coverage is incomplete and bare metal is visible, check as Partial coverage and estimate the Percentage of Uncoated metal for each item.
- 8.5.2.1 Uncoated metal is defined as that area that is dry and without any coating of grease. Some care should be used in judging uncoated metal, as the thickness of the coating has no bearing on acceptability. Very thin coatings will be slightly tacky and will readily hold fingerprints.
- 8.6 **QCD** Any other unusual conditions shall be documented on Data Sheet 6.0, such as: water or other liquid present or draining during grease cap removal as well as the quantity of liquid (refer to Procedure SQ 6.1); quantities of dirt or other foreign matter in or around the tendon end or grease cap, etc.
- 8.7 **<u>QCD</u>** The color of the grease on or around the tendon shall be compared to a sample of new unused grease for color or other variations from the new sample. While color is not a factor requiring acceptance, significant variations in color could be a sign of degradation of the protection medium. Document the comparison on Data Sheet 6.0.
- 8.7.1 If the colors of the samples are reasonably close to each other, check the Match area on Data Sheet 6.0 and identify the color.



- 8.7.2 If the colors vary greatly, check the No Match area and identify the color and variation, i.e., medium brown, darker than new sample. Document if any of the following items are observed during visual inspection of the grease:
- 8.7.2.1 Extreme discoloration.
- 8.7.2.2 Presence of corrosive particles and/or dirt mixed within the grease, indicating adjacent metal pitting and metal breakdown.
- 8.7.2.3 Signs of moisture within the bulk filler (grease).
- 8.7.2.4 Other signs of grease deterioration.
- 8.8 **<u>QCD</u>** If required per SQ2.0, two-one quart samples of grease shall be taken from each end of the tendon prior to cleaning the anchorage and grease cap or using solvent cleaner. It is preferred that the grease be taken from the area of the anchorage, but may also be taken from the grease cap or tendon void. Document the amount of samples taken and the location of removal on Data Sheet 6.0. Refer to PSC Procedure SQ 7.0 for grease sample testing.
- 8.8.1 Each sample can shall be identified by plant name, unit number, tendon number, tendon end, sample number and date.
- 8.8.2 Refer to SQ7.0 for sample storage and retention requirements.
- 8.9 **<u>QCD</u>** Determine the amount of grease that may have been lost during removal of the grease cap on Data Sheet 6.0. The Grease Loss from the tendon duct shall be kept separate and posted as required of Section 10.4 of this procedure.
- 8.9.1 <u>**QCD**</u> If the grease in the grease cap is in satisfactory condition, it may be reused at the discretion of the QC Inspector. If it is to be disposed of, document quantity of grease that is removed from the grease cap on Data Sheet 6.0.

9.0 ANCHORAGE CLEANUP

- 9.1 When the tendon is to be visually inspected it will be necessary to perform a cleanup of the tendon end anchorage assembly to permit inspection.
- 9.2 Any grease removal shall be performed in such a manner to prevent damage, such as scratches on the anchorage or tendon wires. The removal process shall not add any contaminants to the remaining grease or the grease which could be taken for chemical analysis.
- 9.3 Excess grease shall be removed from the tendon anchorage threads using clean non-metallic devices. Use bristle brushes of medium stiffness or rags with suitable quantities of solvent to dilute and wash away the grease. This cleanup must be sufficient to provide satisfactory condition for thread inspection.



- 9.4 Continue the cleanup of the remaining portions of the tendon end, to include the shims, buttonheads, anchorage and bearing plate as necessary.
- 9.5 Viscosity Oil, Viscor #16A industrial solvent or equal shall be used to complete whatever cleanup may be necessary to perform subsequent activities.
- 9.6 **<u>QCD</u>** Document the quantity of grease removed from the anchorage on Data Sheet 6.0.
- 9.7 **<u>QCD</u>** Document and describe damage (if any) caused by the removal of the grease cap or cleaning of the anchorage assembly on Data Sheet 6.0.

10.0 TENDON PROTECTION

- 10.1 All tendon ends and anchorages shall be protected by covering with a plastic bag or sheeting whenever the tendon is not being worked on. Smear or brush a light coating of grease onto the wires, buttonheads and anchorhead prior to covering.
- 10.2 It will be acceptable to replace the grease caps as a temporary measure, using the old gaskets, until that tendon inspection can be completed.
- 10.3 **<u>QCD</u>** Document the method of tendon protection on Data Sheet 6.0. If the grease cap is temporarily installed, note if a new gasket or old gasket was used.
- 10.4 **<u>QCD</u>** Document the grease losses that are detected from the tendon duct itself. These losses shall be kept separate from the losses that occur from the tendon end anchorage assembly and the grease cap. This total shall not be finalized until the grease cap is installed permanently, as additional grease may be lost after the initial inspection.
- 10.5 **<u>QCD</u>** Total the grease loss from previous sections in order to calculate the total amount of grease lost from this end of the tendon and document on Data Sheet 6.0.

11.0 DOCUMENTATION

- 11.1 The items requiring documentation in this procedure shall be documented on Data Sheet 6.0 included with this procedure.
- 11.1.1 The Data Sheet references the applicable Section or Step number of the procedure for each <u>QCD</u>.
- 11.1.2 **<u>QCD</u>** Post the calculated total grease loss (10.5) from this end to Data Sheet 12.1.

12.0 ATTACHMENTS

12.1 Data Sheet 6.0.

| | PSC PROCEDURE SQ 6.0 GREASE CAP REMOVAL Data Sheet 6.0 July 31, 2009 Page1 of 1 Revision 0 |
|--|---|
| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
| (7.2) Tendon No.: Tendon End: | Shop Field |
| Grease Cap Removal | |
| (7.5)Date Removal Started: (7.6) Dry Ice Used on Grease Cap and/or Anchorage Yes (7.6) Dry Ice Used on Grease Cap and/or Anchorage Yes (7.7) Temp. of Concrete: °F Ambient Temp.: °F Thermometer No.: Re-Cal Date: (8.4) Anchorhead I.D.: Anchorhead Verification: (8.5) Grease Coating Grease Cap - Complete Partial Uncoated % Anchorhead - Complete Partial Uncoated % Shims - Complete Partial Uncoated % Bearing Plate - ⁽¹⁾ Complete Partial Uncoated % | Q.C. Signoff |
| (1) - Limited within the inside diameter of the grease cap. (8.6) Unusual Conditions: (8.7) Grease Color Match: Image: Comments: Image: Comments: | |
| (8.8) Quantity of Samples Quart Samples identified per Step 8.8.1? [] Yes [Location ofA.H. [] B.P. [] Shims [] Cap [] Duct Removal | □ No |
| (8.9) Qty. of Grease lost during removal of cap: gal. (8.9.1) Grease from cap to be reused? Yes No Qty. of Grease removed from cap: (9.6) Qty. of Grease removed from anchorage: gal. (9.7) Damage during cap removal or anchorage cleaning? Yes No Describe: (10.3) Method of Tendon Protection: (10.4) Amount of Grease Loss from Tendon duct: gal. | gal |
| (10.5) Total quantity of lost grease (below): (8.8) + (8.9) + (8.9.1) + (9.6) + (10.4) = TOTAL (11.1.2) Document TOTAL grease lost on Data Sheet 12.1, GREASE REPLACEMENT. Yes | No |
| QC Reviewed: Level: | Date: |



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

INSPECT FOR WATER

Prepared by

Christyphe. Co

Approved by

Approved by

PROJECT MANAGER, P.E. Title

Q.A. MANAGER

Title

PRESIDENT Title 07/31/09

07/31/09

Date

07/31/09

Date

Date

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1.0 PURPOSE

1.1 This procedure will establish the requirements for performing an inspection of the Post-Tensioning Tendon System for evidence of water during In-Service-Inspection (surveillance) of the Post-Tensioning System Tendons at Exelon's Three Mile Island Nuclear Plant - Unit 1.

2.0 SCOPE

2.1 This procedure will be limited to performing and documenting the inspection for water from the tendon void or around the tendon anchorage assembly, including the grease cap. This inspection shall be performed just prior to removal of the grease cap and during the physical inspection of the tendon anchorage assembly.

3.0 **RESPONSIBILITY**

3.1 As stated in PSC Procedure QA 4.0.

4.0 QUALIFICATION

4.1 As stated in PSC Procedure QA 4.1.

5.0 EQUIPMENT

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

6.0 PRECAUTIONS

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

7.0 QUALITY CONTROL

- 7.1 This procedure contains no <u>HOLD POINTS</u>. All Quality Control Documentation (<u>QCD</u>) points shall only require documentation of information or evaluation data. The required information or evaluation data shall be documented on Data Sheet 6.1.
- 7.2 The Quality Control Inspector shall be responsible for properly identifying any water samples that may have been collected. The Inspector shall also be responsible for controlling those samples until they are turned over to Exelon or sent out for testing.

8.0 PREREQUISITES

- 8.1 **<u>QCD</u>** Document the Unit #, tendon identification and tendon end on Data Sheet 6.1.
- 8.2 Provide support for the Grease Cap. Be prepared to catch any grease that may fall during loosening and removal.



- 8.3 Care shall be exercised to avoid splashing or spilling grease on concrete and other surfaces. Spilled grease shall be removed and cleaned using Viscosity Oil, Viscor #16A industrial solvent or equivalent. It may be advantageous to tape plastic sheeting around the bearing plate and concrete to lessen the effect of spilled grease.
- 8.4 This inspection will be performed during and after the removal of the grease cap. It is expected that all the tools and preparation for the removal of the grease cap will be in place or have been performed. As the main purpose of this procedure is to detect the presence of water in the tendon void, the Inspector shall be afforded access to the tendon during loosening of the grease cap bolts to see if water is present.

9.0 GREASE CAP REMOVAL

IF UPON REMOVAL OF THE GREASE CAP, IT IS DETERMINED THAT THE ANCHORHEAD IS BROKEN, ALL WORK SHALL STOP ON THAT TENDON AND ALL PERSONNEL SHALL LEAVE THE AREA OF THE TENDON. THE PSC CONSTRUCTION SUPERVISOR SHALL BE NOTIFIED. THE CONDITION SHALL BE FORMALLY DOCUMENTED BY A NONCONFORMANCE REPORT. THE WORK AND/OR INSPECTIONS SHALL CONTINUE AFTER A SAFETY EVALUATION HAS BEEN MADE AND ONLY AT THE DIRECTION AND CONTROL OF THE PSC CONSTRUCTION SUPERVISOR AND TMI ENGINEERING.

- 9.1 Position platform, as required, at the end of the tendon to be inspected. (As part of Grease Cap Removal Procedure, SQ 6.0)
- 9.2 Place a container and/or a protective cover under the tendon grease cap to protect adjacent areas from dripping grease. (As part of Grease Cap Removal Procedure, SQ 6.0)
- 9.3 Have a clean dry plastic container available for catching water samples.
- 9.4 As the main purpose of this procedure is to determine the presence of water in the grease cap or around the anchorhead, the Inspector shall be alert to obtain samples of that water as the cap is loosened and removed and to estimate the quantity detected.
- 9.5 Remove the bolts holding the grease cap to the bearing plate. The grease cap must be fully supported as the bolts are being removed. Care should be taken when removing the end cap since the bulk filler may drop off or drip as a liquid of medium viscosity. Allow the Inspector the opportunity to obtain water samples, if any water is present. (As part of Grease Cap Removal Procedure, SQ 6.0)



- 9.5.1 **<u>QCD</u>** Document if water was detected, the quantity of water detected and if a sample was collected during removal of the grease cap. In addition, document the distinguishing characteristics of any water detected in accordance with Section 10.0. Also document any other relevant comments.
- 9.6 Carefully remove the grease cap to avoid spilling the contents. The Inspector shall inspect the interior of the cap for the presence of water and if possible collect a sample of that water.
- 9.6.1 **QCD** Document if water was detected, the quantity of water detected and if a sample was collected from inside the grease cap. In addition, document the distinguishing characteristics of any water detected in accordance with Section 10.0. Also document any other relevant comments.
- 9.7 Inspect the tendon anchorage assembly, shims, bearing plate, anchorhead and buttonheads for the presence of water.
- 9.7.1 **QCD** Document if water was detected, the quantity of water detected and if a sample was collected from around the tendon anchorage components. In addition, document the distinguishing characteristics of any water detected in accordance with Section 10.0. Also document any other relevant comments.
- 9.8 Work shall continue for the In-Service Inspection as regularly scheduled or as required by the Procedures in the Surveillance Program Quality Control Manual.
- 9.9 The next point that water could be encountered would be during or just after Detensioning the Tendon. Therefore, the Inspector shall be especially vigilant during this portion of the In-Service Inspection to detect the presence of water. Inspect for the presence of water during or after Detensioning the Tendon.
- 9.9.1 **QCD** Document the quantity of water detected and if a sample was collected.

10.0 DISTINGUISHING CHARACTERISTICS

- 10.1 The quantity of water observed in or on the tendon will be described based on the following terms.
- 10.1.1 OBSERVABLE MOISTURE
- 10.1.1.1 "Observable Moisture" is defined as that quantity of water which has been immediately observed by the Inspector to be concentrated, collected or draining out from the grease cap or tendon anchorage assembly. While this is intended to describe that moisture condition associated with condensation, it could be present in quantities of less than 8 ounces.



PSC PROCEDURE SQ 6.1 INSPECT FOR WATER July 31, 2009 Page 5 of 5 Revision 0

10.1.2 SIGNIFICANT MOISTURE

10.1.2.1 "Significant Moisture" is defined to be a quantity of water 1/2 pint (8 ounces) or more which has collected, concentrated or observed to be draining out of the tendon anchorage assembly or grease cap. This quantity is considered to be from a condition other than water formed through condensation.

11.0 NOTIFICATION

- 11.1 **QCD** Exelon shall be notified with a formal letter within 24 hours when water, regardless of quantity, has been detected during the In-Service Inspection. This Notification shall define the condition detected referencing Section 10 of this Procedure and the specific quantity detected.
- 11.2 Exelon shall be responsible for any corrective action and/or Notification to the NRC should that be required.
- 11.3 The work and inspection shall continue until completed or formal notification by Exelon to halt the work is received.

12.0 SAMPLE RETENTION/TESTING

- 12.1 The samples shall be temporarily retained by the PSC Quality Control Inspector until such time that they are sent out for pH testing per PSC Procedure SQ 6.2.
- 12.2 **<u>QCD</u>** Verify that the water samples are adequately identified. Identification includes: Plant Name, Unit #, Tendon Number, Tendon End, and date.
- 12.3 **<u>QCD</u>** Document the location of storage for the samples.

13.0 DOCUMENTATION

- 13.1 The items in this procedure requiring documentation shall be documented on Data Sheet 6.1.
- 13.2 The Data Sheet references the applicable section number of the procedure for each **<u>QCD</u>** Point.

14.0 ATTACHMENTS

- 14.1 Water Notification Letter
- 14.2 Data Sheet 6.1

| | | I | C PROCEDURE SQ 6.1 NSPECT FOR WATER DTIFICIATION LETTER July 31, 2009 Page 1 of 1 Revision 0 |
|----------------|---|---|---|
| To: | | | |
| - Subject: | PSC Procedure SQ 6.1: Inspect for Water | | |
| Project: _ | TMI 35 TH YEAR TENDON SURVEILLANCE | UNIT 1 | |
| Tendon No: | Tendon End: | Shop | Field |
| | Notification of Wa | ter | |
| regardless o | ocedure SQ 6.1 Section 11, "Exelon shall be notified with f quantity, has been detected during the In-Service Inspe erencing Section 10 of this Procedure and the specific qu | ction. This Notification shall define | |
| This letter is | to notify you that water was found in the tendon mention | ed above. | |
| Quantity | of Sample obtained: | | |
| Descripti | on of Condition: | | |
| | | ······ | |
| | | | 107250-8 |
| Per PSC Pro | ocedure 6.1 Section 10, the observed water is categorized | d as follows: | |
| | Section 10.1.1 – OBSERVABLE MOISTURE | | |
| | "Observable Moisture" is defined as that quot observed by the Inspector to be concentrat tendon anchorage assembly. While this is i associated with condensation, it could be p | ed, collected or draining out fror ntended to describe that moistu | n the grease cap or re condition |
| | Section 10.1.2 – SIGNIFICANT MOISTURE | | |
| | "Significant Moisture" is defined to be a qua collected, concentrated or observed to be o grease cap. This quantity is considered to b condensation. | Iraining out of the tendon ancho | rage assembly or |
| | | | |
| Signature: | | Level: Dat | e: |

| Project: TMI 35 TH YEAR TENDON SURVEILLANCE | |
|--|------------|
| (8.1) Tendon No.: | Field |
| (9.5.1) DURING REMOVAL OF GREASE CAP | |
| Water Detected: 🗌 Yes 🗌 No Quantity: Sample Taken: 🗌 Yes | 🗌 No 🗌 N/A |
| Moisture Description: Observable Moisture Significant Moisture Not App | plicable |
| Comments: | |
| (9.6.1) INSIDE GREASE CAP | |
| Water Detected: 🗌 Yes 🗌 No Quantity: Sample Taken: 🗌 Yes | 🗌 No 🗌 N/A |
| Moisture Description: Observable Moisture Significant Moisture Not App | plicable |
| Comments: | |
| (9.7.1) AROUND TENDON ANCHORAGE COMPONENTS | |
| Water Detected: Yes No Quantity: Sample Taken: Yes | 🗌 No 🔲 N/A |
| Moisture Description: Observable Moisture Significant Moisture Not App | plicable |
| Comments: | · |
| (9.9.1) DURING DETENSIONING | |
| | 🗌 No 🗌 N/A |
| Moisture Description: Observable Moisture Significant Moisture Not App | |
| Comments: | • • |
| (11.1) NOTIFICATION | |
| | ate: |
| SAMPLE IDENTIFICATION AND STORAGE | |
| (12.2) Samples adequately identified: 🔲 Yes 🔲 No | |
| (12.3) Samples stored at: | |
| | |
| QC Signoff: Date: | |
| QC Reviewed: Date: | |



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

WATER SAMPLE ANALYSIS

uald Buss Prepared by

Approved by

Title

PRESIDENT Title

Q.A. MANAGER

Title

07/31/09 Date

PROJECT MANAGER, P.E.

07/31/09 Date

07/31/09

Date



1.0 PURPOSE

1.1 This procedure will establish the requirements for laboratory pH analysis of Water samples taken during the 35th Year In-Service-Inspections (surveillance) of the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

2.0 **RESPONSIBILITY**

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

PRECISION SURVEILLANCE CORPORATION

3468 Watling Street

East Chicago, IN 46312

Attention: Quality Assurance

- 2.1.1 The Laboratory shall further be responsible to utilize trained personnel for the analysis and maintain the calibrated status, traceable to the NIST as applicable, for all test or measuring devices that may be used in providing test results.
- 2.1.2 The Laboratory shall provide open access for inspection, survey or audit, as the need might arise, to PSC or its customers.
- 2.2 The PSC Quality Assurance Section shall be responsible for the qualification of Laboratory sources.
- 2.3 Where specified in the Contract Documents, Exelon shall have the right of approval for Laboratory sources.
- 2.4 The PSC Quality Control and/or Engineering Department shall review the reports for accuracy and content.
- 2.4.1 This report shall be submitted to Exelon with the final Surveillance Report.

3.0 SAMPLES

- 3.1 The Water Samples shall be sent to the Laboratory by any convenient mode of transportation. The samples will have been marked to show the plant name, unit number, tendon number and the tendon end or buttress identification. The sample shall be securely closed to prevent leakage and packaged to prevent damage.
- 3.2 The samples shall maintain a form of identification throughout testing that will provide traceability to the original sample identification.



3.3 The Laboratory shall notify PSC if it appears that the sample container has been damaged, tampered with, or any other occurrence that could contaminate the water sample.

4.0 TEST DESCRIPTIONS

4.1 Each sample of Water shall be analyzed for pH

5.0 TEST METHOD

5.1 Each sample of Water shall be tested by the following test method: "pH by ASTM D-1293 or EPA 150.1 or equivalent"

6.0 REPORT

- 6.1 A copy of the report for the analysis of water shall be submitted to PSC.
- 6.2 The report shall bear the date of testing and sample identification as it appears on each sample container.
- 6.3 The report shall be signed by the Laboratory Manager, who shall ultimately be responsible for the content.

7.0 SAMPLE DISPOSAL

7.1 The remaining water samples may be scrapped 30 days after the issue of the report, unless the Laboratory is requested in writing to hold the samples for a longer period of time.



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

SHEATHING FILLER ANALYSIS

Terald Busso Prepared by

Approved by

Approved by

PROJECT MANAGER, P.E. 07/31/09 Title Date

PRESIDENT Title

Q.A. MANAGER

Title

07/31/09

07/31/09

Date

Date



1.0 PURPOSE

1.1 This procedure will establish the requirements for laboratory chemical analysis of Sheathing Filler (Grease) samples taken during the 35th Year In-Service-Inspections (surveillance) of the Post-Tensioning System Tendons of Exelon's Three Mile Island Nuclear Plant - Unit 1.

2.0 **RESPONSIBILITY**

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

PRECISION SURVEILLANCE CORPORATION

3468 Watling Road

East Chicago, IN 46312

Attention: Quality Assurance

- 2.1.1 The Laboratory shall further be responsible to utilize trained personnel for the analysis and maintain the calibrated status, traceable to the NIST, for all test or measuring devices that may be used in providing test results.
- 2.1.2 The Laboratory shall provide open access for inspection, survey or audit, as the need might arise, to PSC or its customers.
- 2.2 The PSC Quality Assurance Section shall be responsible for the qualification of Laboratory sources.
- 2.3 Where specified in the Contract Documents, Exelon shall have the right of approval for Laboratory sources.
- 2.4 The PSC Quality Control and/or Engineering Department shall review the reports for accuracy and content as required by this procedure and for evaluation of the acceptability of those results according to the requirements of this procedure.
- 2.4.1 This report shall be submitted to Exelon with the Final Report.



PSC PROCEDURE SQ 7.0 SHEATHING FILLER ANALYSIS July 31, 2009 Page 3 of 6 Revision 0

3.0 SAMPLES

- 3.1 Sample #1 shall be sent to the testing laboratory for analysis in accordance with this procedure upon project completion unless otherwise notified by TMI Engineering. Sample #2 may be turned over to Exelon to be held in reserve in the event of loss, retesting or for verification of the results of the original testing. Exelon may be responsible for the control and disposal of Sample #2. It is unlikely that a suitable quantity of Sample #1 shall remain after the original tests to perform supplemental tests, therefore any remainder of Sample #1 will be scrapped.
- 3.2 In the event that the test results for Sample #1 do not meet the stated requirements of Section 8.0 of this Procedure, Exelon shall be immediately notified of the deficiency, with a formal letter to follow shortly thereafter. Sample #2 shall then be sent to the testing laboratory for confirmation analysis in accordance with this procedure.
- 3.3 If PSC is required to test Sample #2 and that sample fails to meet the requirements of Section 8.0 of this Procedure, Exelon shall be immediately notified of the deficiency, with a letter to follow shortly thereafter.
- 3.4 The sample cans will have been marked to show the plant name, unit number, tendon number, and the tendon end or buttress identification and sample number. The can shall be securely closed to prevent leakage and packaged to prevent damage.
- 3.5 The samples shall maintain a form of identification throughout testing, which will provide traceability to the original sample identification.
- 3.6 The Laboratory shall notify PSC if it appears that the sample container has been damaged, tampered with, or any other occurrence that could contaminate the grease sample.

4.0 TEST DESCRIPTIONS

4.1 Each sample of Grease (Sheathing Filler) shall be analyzed for Chemical Properties and Physical Properties as specified in the following sections 5.0 and 6.0.

5.0 TEST METHOD - CHEMICAL PROPERTIES

- 5.1 Each sample of Grease shall be mixed and tested as follows:
- 5.2 Water Soluble Impurities (ASME Section XI Table IWL 2525-1)
- 5.3 A water extraction of each sample of grease shall be made and tested as follows:
- 5.3.1 Using a spatula, coat the inside, bottom and sides, of a one liter glass beaker with 100 (plus or minus 10) grams of the grease.



- 5.3.2 The coated beaker shall be filled with about 900 ml of distilled water at room temperature.
- 5.3.3 Heat the filled beaker in an oven or by use of an immersion heater to 100°F (37.80°C) plus or minus 20°F for 4 hours. DO NOT HEAT ON A HOT PLATE.
- 5.3.4 Run a blank on distilled water. If titrate use a microburet, 1 ml or 5 ml with 0.01 0.05 ml graduation levels.
- 5.3.5 Decant water and analyze for soluble ions. Test only for salts in leached water.
- 5.3.6 The water extraction shall be tested by the below cited test procedures for the appropriate water soluble ions. The results shall be reported as parts per million (ppm) in the extracted water.
- 5.3.6.1.1 Chlorides (CI) by ASTM D-512
- 5.3.6.1.2 Nitrates (NO₃) by ASTM D-992
- 5.3.6.1.3 Sulfides (S) by APHA 427C "Methylene Blue Method"-(APHA 427C 15th Edition replaced by APHA 4500-S2D 17th Edition)

6.0 TEST METHOD - PHYSICAL PROPERTIES

- 6.1 Each sample of Grease shall be tested as follows:
- 6.2 Moisture Content by ASTM D-95
- 6.3 Neutralization No. by ASTM D-974 Modified
- 6.3.1 The Neutralization Number (Reserve Alkalinity/Total Base Number) shall be performed in accordance with ASTM D-974 and the following modification (per ASME Section XI, Table IWL-2525-1):
- 6.3.1.1 Place 10 g of sample in a 500 ml Erlenmeyer flask. Add 10 cc isopropyl alcohol and 5 cc toluene. Heat until sample goes into solution.
- 6.3.1.2 Add 90 cc Distilled water and 20 cc $1N H_2SO_4$.
- 6.3.1.3 Place in a steam bath for one-half hour. Stir well.
- 6.3.1.4 Add a few drops of indicator (1% phenolphthalein) and titrate with 1N NaOH until the lower layer just turns pink.
- 6.3.1.5 If acid or base solutions are not exactly 1N, the exact normalities should be used when calculating the base number.



6.3.1.6 The Total Base Number (TBN), expressed as milligrams of KOH per gram of sample, is calculated as follows:

$$TBN = \frac{[(20)x(NA) - (B)x(NB)]}{W} x56.1$$

where

B = milliliters NaOH

 $NA = normality of H_2SO_4$ solution

NB = normality of NaOH solution

W = weight of sample in grams

7.0 REPORT

- 7.1 Two copies of each report for the analysis of grease shall be submitted to PSC.
- 7.2 Each report shall bear the date of testing and sample identification as it appears on each can.
- 7.3 Each report shall be signed by the Laboratory Manager, who shall ultimately be responsible for the content.
- 7.4 <u>Accuracy</u>
- 7.4.1 The concentration of water soluble chlorides, nitrates and sulfides shall be reported within an accuracy of 0.1 ppm.
- 7.4.2 The concentration of water shall be reported within an accuracy of 0.1 percent of dry weight of grease.
- 7.4.3 The Neutralization Number shall be reported within an accuracy of 0.01 mg. reagent per gram of grease.



PSC PROCEDURE SQ 7.0 SHEATHING FILLER ANALYSIS July 31, 2009 Page 6 of 6 Revision 0

8.0 ACCEPTANCE OF ANALYSIS

- 8.1 The chemical analysis of the grease samples only concern the concentration of water soluble impurities, water in the samples and where required Reserve Alkalinity (Base Number).
- 8.2 The following concentrations shall not be exceeded:
- 8.2.1 Water soluble Chlorides 10 ppm
- 8.2.2 Water soluble Nitrates 10 ppm
- 8.2.3 Water soluble Sulfides 10 ppm
- 8.2.4 Water Content (H_2O) 10% dry weight of filler
- 8.2.5 <u>Reserve Alkalinity</u>
- 8.2.5.1 (Base number) Shall be at least 50% of the as-installed value, unless the asinstalled value is 5 or less, in which case the base number shall be no less than zero. If the tendon duct is filled with a mixture of materials having various asinstalled base numbers, the lowest number shall govern acceptance. The tendons at Exelon's TMI plant were filled with 2090P-2 grease so the 50% value is a minimum of 0 mg KOH/g.

9.0 NOTIFICATION NON-ACCEPTANCE

- 9.1 In the event that Sample #2 does not meet the required controls of Section 8.0 above, Exelon shall be formally notified by PSC Personnel for those unacceptable results after reviewing the reports. If PSC Quality Control is still on site when the tests have been completed, Exelon shall be notified of this deficiency with a nonconformance report.
- 9.2 Exelon shall be responsible for evaluating the significance of the deficiency and to determine if corrective measures are required.

10.0 SAMPLE DISPOSAL

- 10.1 The remaining sample grease may be scrapped 30 days after the issue of the report, unless the Laboratory is requested in writing to hold the samples for a longer period of time.
- 10.2 The PSC Quality Control Department shall retain the option of disposing of the samples in less than 30 days if the results of the grease analysis are acceptable.



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION **IN-SERVICE INSPECTION TENDON SURVEILLANCE PROGRAM**

THREAD MEASUREMENT OF ANCHORAGES

uall Busson Prepared by

proved b

QA MANAGER Title

07/31/09

Date

PROJECT MANAGER, P.E. 07/31/09 Title Date

PRESIDENT Title

07/31/09

Date



1.0 PURPOSE

1.1 This procedure will be used as the means of measuring anchorage thread diameters to assure that the external threads of a tendon anchorage meet a minimum strength requirement of 120% of the minimum Guaranteed Ultimate Tensile Strength (GUTS) of a tendon, when coupled with a specific Stressing Adaptor.

2.0 SCOPE

- 2.1 This procedure shall address only those anchorages that have a 4 pitch stub ACME Thread (Class 2G). Design drawings show that the anchorages are a Grade 4140 steel, heat treated to a Brinell Hardness of 355 to 401. Furthermore, this procedure shall be limited to those anchorages of tendons to be monitored or detensioned and retensioned.
- 2.2 If the anchorage material is not of the type mentioned above, then the thread strength prediction equations shall be adjusted accordingly by the PSC Engineering Department.

3.0 **RESPONSIBILITY**

3.1 A PSC Quality Control Inspector shall be responsible for taking thread measurements. The PSC Manager of Engineering, or his designee, shall be responsible for generating tables listing allowable external thread diameters for a specific Stressing Adaptor.

4.0 DOCUMENTATION

- 4.1 All measurements shall be recorded, signed and dated by the Inspector on the form provided with this procedure. The only Hold Point in this procedure is the acceptability of the measurements and acceptable match up with a stressing adaptor.
- 4.2 **QCD-** All measurements, gauge identification and calibration status shall be documented on Data Sheet 7.1 as required.

5.0 MEASURING INSTRUMENTS

- 5.1 The following instruments shall be necessary for thread measurements.
- 5.1.1 Standard Outside Measuring Micrometer capable of reading to 0.001" or better.
- 5.1.2 Standard Inside Measuring Micrometer capable of reading to 0.001" or better.
- 5.1.3 Special Pitch Diameter Go and No-Go Thread Plug Gauges.
- 5.1.4 A set of three hardened standard stub ACME thread wires (diameter 0.129" to 0.162").



5.1.5 Shims, used in the three-wire method of measurement.

6.0 MEASURING THREAD DIAMETERS

- 6.1 Two readings in perpendicular directions shall be taken for each thread measured. A centering head and rule should be used to assure that the readings are perpendicular to each other. Crayon or soapstone can be used to mark locations, but care should be taken so as not to place the marks exactly where readings are taken, which would interfere with the accuracy of the measurements.
- 6.2 EXTERNAL MAJOR DIAMETERS
- 6.2.1 External Major Diameters shall be measured for the 3rd, 6th and 9th threads. Measurements shall be made with an Outside Micrometer as shown in Figure 1 of Appendix 1.
- 6.2.1.1 The Major Diameter is given directly by the micrometer reading.
- 6.3 EXTERNAL PITCH DIAMETERS
- 6.3.1 External Pitch Diameters shall be measured for the 3rd and 9th threads. Measurements shall be made with an Outside Micrometer and three stub ACME thread wires of equal diameters as shown in Figure 2 of Appendix 1. Standard stub ACME thread wires of diameters ranging from 0.129" to 0.162" shall be used. Wire diameters shall be selected such that: (1) the wire rests on the tapered sides of the thread, not on the root flat, and (2) the wire protrudes beyond the crest of the thread as shown in Figure 2 of Appendix 1.
- 6.3.1.1 The Pitch Diameter Constant dimension shall be determined from Appendix 2 for the wire diameter used. The shim thickness shall be added to the constant and the total subtracted from the micrometer reading to give the pitch diameter.
- 6.4 EXTERNAL MINOR DIAMETERS
- 6.4.1 External Minor Diameters shall be measured for the 3rd and 9th threads. Measurements shall be made with an Outside Micrometer and three wires of equal diameters as shown in Figure 3 of Appendix 1. Wire diameter shall be selected such that: (1) the wire rests on the root flat, not on the tapered sides of the thread, and (2) the wire protrudes beyond the crest of the thread as shown in Figure 3 of Appendix 1.
- 6.4.1.1 The sum of twice the selected wire diameter and shim thickness shall be subtracted from the micrometer reading to give the minor diameter.



PSC PROCEDURE SQ 7.1 THREAD MEASURING July 31, 2009 Page 4 of 6 Revision 0

6.5 INTERNAL MAJOR DIAMETERS

- 6.5.1 Internal Major Diameters shall be measured for the 3rd and 9th threads. Measurements shall be made with an Inside Micrometer with needle points as shown in Figure 4 of Appendix 1. Precautions shall be taken to reduce the angularity of the micrometer to a minimum, as shown. The angular reading overestimates the diameter by 0.00013" or less. This small discrepancy shall be ignored.
- 6.5.1.1 The Major Diameter is given directly by the micrometer reading.
- 6.6 INTERNAL PITCH DIAMETERS
- 6.6.1 Internal Pitch Diameters shall not be measured. However, a check shall be made using Go and No-Go Plug Gauges to ensure that pitch diameters fall within specified limits. If the Go gauge does not go, or the No-Go gauge goes, that fact shall be recorded.
- 6.7 INTERNAL MINOR DIAMETERS
- 6.7.1 Internal Minor Diameters shall be measured for the 3rd, 6th and 9th threads. Measurements shall be made with an Inside Micrometer as shown in Figure 5 of Appendix 1.
- 6.7.1.1 The Minor Diameter is given directly by the micrometer reading.

7.0 ANCHORAGE DISPOSITION

- 7.1 STRESSING ADAPTOR (INTERNAL THREADS)
- 7.1.1 The Stressing Adaptor shall have been accepted by PSC based on acceptance of the NO-GO thread plug gauge test fit. Actual major and minor thread diameters shall be documented.
- 7.2 BUSHING, FIELD ANCHORHEAD (EXTERNAL THREADS)
- 7.2.1 For purposes of expediency the bushing or field anchorhead external threads shall be identified as external threads in this section of the procedure since the measurements and requirements are identical, but shall be documented for specific identity.
- 7.2.2 Once an adaptor has been measured, the PSC Engineering Department shall generate a Stressing Adaptor Disposition Table for that Adaptor. These tables list allowable external thread diameters for a bushing or field anchorhead to be coupled to a specific adaptor and still meet the minimum strength requirements.



PSC PROCEDURE SQ 7.1 THREAD MEASURING July 31, 2009 Page 5 of 6 Revision 0

- 7.2.2.1 These tables are based on calculations that consider that it shall be necessary to maintain full engagement with the adaptor and external thread (bushing or field anchorhead) at all times during stressing or detensioning operations.
- 7.2.3 Select a stressing adaptor and external thread to be dispositioned.
- 7.2.4 Select the Stressing Adaptor Disposition Table, Appendix 4, for the adaptor to be evaluated. The Adaptor Identification will appear near the top of the table.
- 7.2.5 Using the major diameter of the external thread and referring to the columns under the heading Major Ranges, within the first two lines representing the range of major dimensions, locate that range into which the major dimension of the external thread will fall. This shall establish the Major control vertical column for that external thread.
- 7.2.6 With the pitch diameter of the external thread and using the Pitch Range column at the left edge of the table, read down to that range of dimensions into which the pitch diameter measurement of the external thread will fall. This shall establish the Pitch control horizontal line for that external thread.
- 7.2.7 The intersection of the Pitch control horizontal line with the Major control vertical column shall provide the Minor diameter control dimension.
- 7.2.7.1 If the Minor diameter control is less than the measured minor dimension of the external thread, then that combination of external thread and stressing adaptor is acceptable.
- 7.2.7.2 If the Minor diameter control dimension is greater than the measured minor dimension of the external thread, that combination is not acceptable and another stressing adaptor shall be selected to be mated to the external thread. Therefore, Section 7.2.6. shall be repeated until acceptable matches are provided.

8.0 DOCUMENTATION

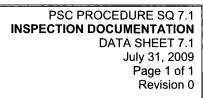
8.1 The items requiring documentation in this Procedure shall be documented on Data Sheet 7.1 as each might apply.

9.0 ATTACHMENTS

- 9.1 Data Sheet 7.1
- 9.2 Appendix 1 Figures for Thread Diameter Measurements (These figures are used to illustrate the manner of measuring thread diameters.)

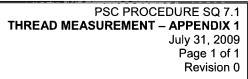


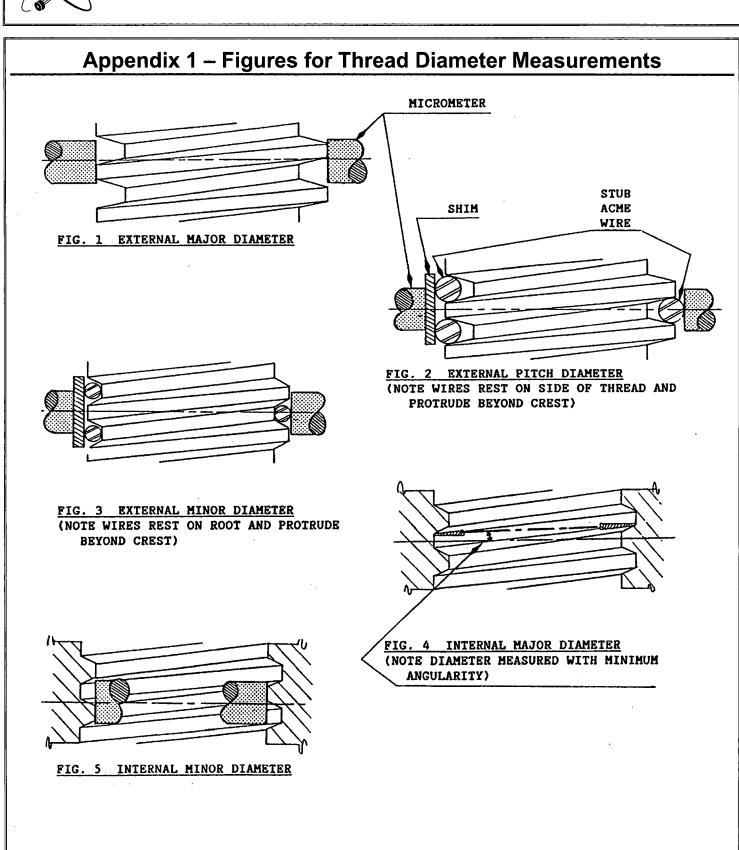
- 9.3 Appendix 2 Pitch Diameter Constant For 3 Wire Method(This table lists the pitch diameter constant dimensions necessary for calculating an external pitch diameter.)
- 9.4 Appendix 3 NBS Allowable Diameter Ranges(This is a computer generated table of allowable external and internal diameter ranges for 4 pitch stub ACME threads (Class 2G) as specified by Federal Standard Publication FED-STD-H28/13.)
- 9.5 Appendix 4 Stressing Adaptor Disposition Tables (These tables shall be used for dispositoning a bushing or field anchorhead paired with a specific Stressing Adaptor. One table shall be computer generated for each Adaptor. Since these tables cannot be generated until the Adaptors are measured, it is likely these tables will be added to this procedure at a later date than initial submittal of this procedure. However, these tables shall be supplied as soon as possible.)



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| Pro | ject: | 5 th YEAR | TENDON | I SURVEIL | LANCE | | | | | | |
|------------|---|----------------------|-----------------|---------------------------------|------------|------------|----------------------------------|--|--|--------------------|------------|
| Ter | idon No.: | | | т | endon E | End/Buttro | ess No.: | | | | |
| Anc | horage ID.: | <u></u> | | д | daptor I | D: _ | | | | - | |
| | EQUIPMENT MICROMETER | | | | | | WIR | E | | SI | HIMS |
| | Thread Mic ID | | | Recal | Date | I | D No. | Recal Da | te | ID No. | Recal Date |
| | Ext. <u>Major</u> Ext. Pitch | | | | | | | | | | |
| | Ext. Minor Int. | | | | | | | | | | |
| | Int. N/A Int. N/A Minor N/A MEASUREMENTS Thread | | | N// | | | | an an an an an an an an an an an an an a | | 1999 - P.A. 199 | |
| | | | <u> </u> | THREAD | | | Wire | | Wire | s Shi | m Average |
| | | | 3 rd | 6 th 9 th | | - A | verage | Constant | Diame | | |
| | Ext. Major | 1 2 | | | | | | | | | |
| | Ext. Pitch (1) | 1 2 | | | | _ | | | a tha an an an an an an an an an an an an an | | |
| | Ext. Minor (2) | 1 | | | | - | | | | | |
| 1 | Int. Major | 1 | N/A N/A | | N/A N/A | | | c fair a start of the | | | |
| | Int. | 1 | N/A N/A | N/A | N/A | | | | | | |
| | Minor | 2 | N/A | N/A | N/A |] | | | and a set of | | |
| | Int. | Go (| Gauge ID | : <u> </u> | Α | | Recal Da | ate: <u>N/</u> / | Α | Result: | N/A |
| | Pitch | No-C | Go Gauge ID | • N// | Α | | Recal Da | ate: N/. | ۹ | Result: | N/A |
| <u>Not</u> | | Minor Dia | | | | | it] – [Shim Si: meter] – [Shi | | | | |
| | _ | | | | Adapto | or Mark | Trial 1 | Trial 2 | Tria | 13] | Frial 4 |
| | | Min. N | | meter from | | | | | | | |
| | | | | Acceptable | e? (Yes | or No) | | | | | |
| | Signoff: | | | | | | Level: | | Date: | | |
| QC | Reviewed: | | | | | | Level: | | Date: | | |
| | | | | | | | | | | | |







Appendix 2 – Pitch Diameter for 3 Wire Method

From Federal Standard H28/13 C = $w(1 + \csc a) - (\cot a) 2/n$ gives CON = 4.993929(W) -0.483392

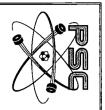
| | | | | | | | | السريح وروار | |
|---------|------|----------------|--|---------|-------|-------------|---------|----------------------|-------------|
| WIRE | | WIRE | | WIRE | | WIRE | | WIRE | 175 P 5 5 5 |
| SIZE | CON. | SIZE | CON. | SIZE | CON. | SIZE | CON. | SIZE | CON. |
| | | | | | | | | 4 470 | 771 |
| .1290 | .161 | -1325 | .178 | .1360 | .196 | .1395 | .213 | .1430 | .231 |
| .1291 | .161 | .1326 | .179 | .1361 | .196 | .1396 | .214 | .1431 | . 231 |
| .1292 | .162 | .1327 | .179 | .1362 | .197 | .1397 | .214 | .1432 | .232 |
| .1293 | .162 | .1328 | .180 | .1363 | .197 | .1398 | .215 | .1433 | .232 |
| 1294 | .163 | .1329 | .180 | .1364 | .198 | .1399 | .215 | .1434 | .233 |
| | | • | | | | | | A 4 79 8 | .233 |
| .1295 | .163 | .1330 | .181 | .1365 | .178 | .1400 | .216 | .1435 | |
| .1295 | .164 | .1331 | .181 | .1366 | .199 | .1401 | .216 | .1436 | .234 |
| .1297 | .164 | .1332 | .182 | .1367 | .179 | .1402 | .217 | .1437 | .234 |
| .1298 | .165 | .1333 | .182 | .1368 | .200 | .1403 | .217 | . 1438 | .235 |
| .1299 | .165 | .1334 | .183 | .1369 | .200 | .1404 | .218 | .1439 | .235 |
| | | | | | | | | | an and it |
| .1300 | .166 | .1335 | .183 | .1370 | .201 | .1405 | .218 | .1440 | .236 |
| .1301 | .166 | .1336 | .184 | .1371 | .201 | .1406 | .219 | .1441 | .236 |
| .1302 | .167 | .1337 | .184 | .1372 | .202 | .1407 | .217 | .1442 | .237 |
| .1303 | .167 | .1338 | . 185 | .1373 | .202 | .1408 | .220 | . 1443 | .237 |
| ,1303 | .168 | 1339 | .185 | .1374 | .203 | .1409 | .220 | .1444 | .238 |
| .1304 | .100 | | | | | | | | |
| ,1305 | .168 | .1340 | . 183 | .1375 | . 203 | 1410 | .221 | .1445 | .238 |
| .1305 | .169 | ,1341 | .186 | .1376 | .204 | .1411 | .221 | .1446 | . 239 |
| | .169 | .1342 | .187 | .1377 | .204 | .1412 | .222 | .1447 | .239 |
| .1307 | 170 | .1343 | .197 | .1378 | . 205 | .1413 | . 222 | .1448 | .240 |
| .1308 | .170 | .1344 | .188 | .1379 | 205 | .1414 | .223 | . 1449 | . 240 |
| .1309 | .170 | * 7 944 | | | | | | | |
| .1310 | .171 | .1345 | .188 | .1380 | .206 | .1415 | .223 | .1450 | .241 |
| | | .1345 | .187 | .1381 | .206 | .1416 | .224 | .1451 | .241 |
| .1311 | .171 | .1348 | .187 | 1382 | 207 | 1417 | .224 | .1452 | .242 |
| .1312 | | • | .190 | .1383 | .207 | .1418 | .225 | .1453 | .242 |
| .1313 | .172 | .1348 .1349 | .170 | .1384 | .208 | .1419 | .225 | .1454 | .243 |
| .1314 | .173 | .1347 | | * 700-4 | | | • | _ | |
| .1315 | .173 | .1350 | .191 | .1385 | .208 | .1420 | . 226 | .1455 | .243 |
| | | .1351 | . 191 | .1386 | .209 | .1421 | .226 | .1456 | .244 |
| .1316 | .174 | .1351 | .192 | .1387 | .209 | .1422 | .227 | .1457 | . 244 |
| .1317 | | .1353 | .192 | .1388 | .210 | .1423 | .227 | .1458 | .245 |
| .1318 | .175 | .1353 | .173 | .1389 | .210 | .1424 | .228 | .1459 | .245 |
| .1319 | .175 | -1004 | .173 | 17001 | | | | | |
| 4 7 5 5 | .176 | .1355 | . 193 | .1390 | .211 | .1425 | .228 | .1460 | .246 |
| .1320 | | | . 173 | .1370 | .211 | . 1426 | .229 | .1461 | .246 |
| .1321 | .176 | .1356 | | .1371 | .211 | .1427 | .229 | .1462 | .247 |
| .1322 | .177 | .1357 | -194 | | .212 | .1428 | .230 | .1463 | .247 |
| .1323 | .177 | .1358 | .195 | .1393 | | .1429 | .230 | .1454 | .248 |
| .1324 | .178 | .1359 | . 195 | .1394 | .213 | • 1427 | - 230 | • 7 17.7-4 | 10 |
| | | | and the second second second second second second second second second second second second second second second | | | | | n Anna yı Kir Miller | |



Pitch Diameter for 3 Wire Method

From Federal Standard H28/13 C = $w(1 + \csc a) - (\cot a) 2/n$ gives CON = 4.993929(W) -0.483392

| WIRE SIZE | CON. | WIRE Size | CON. | WIRE SIZE | CON. | WIRE SIZE | CON. | WIRE SIŻE | CON. |
|---|---|---|--|---|---------------------------------|---|--|---|---|
| .1465 | 248 | .1500 | - 266 | .1535 | - 283 | .1570 | .301 | .1605 | .318 |
| .1466 | 249 | .1501 | - 266 | .1536 | - 284 | .1571 | .301 | .1606 | .319 |
| .1467 | 249 | .1502 | - 267 | .1537 | - 284 | .1572 | .302 | .1607 | .319 |
| .1468 | 250 | .1503 | - 267 | .1538 | - 285 | .1573 | .302 | .1608 | .320 |
| .1468 | 250 | .1504 | - 268 | .1539 | - 285 | .1574 | .303 | .1609 | .320 |
| .1470 | 251 | .1505 | 268 | .1540 | 286 | .1575 | .303 | .1610 | .321 |
| .1471 | 251 | .1506 | 269 | .1541 | 286 | .1576 | .304 | .1611 | .321 |
| .1472 | 252 | .1507 | 269 | .1542 | 287 | .1577 | .304 | .1612 | .322 |
| .1473 | 252 | .1508 | 270 | .1543 | 287 | .1578 | .305 | .1613 | .322 |
| .1474 | 252 | .1509 | 270 | .1544 | 287 | .1579 | .305 | .1614 | .323 |
| .1475 | 253 | .1510 | .271 | .1545 | .288 | .1580 | .306 | .1615 | .323 |
| .1476 | 254 | .1511 | .271 | .1546 | .289 | .1581 | .306 | .1616 | .324 |
| .1477 | 254 | .1512 | .272 | .1547 | .289 | .1582 | .307 | .1617 | .324 |
| .1478 | 255 | .1513 | .272 | .1548 | .290 | .1583 | .307 | .1618 | .325 |
| .1479 | 255 | .1514 | .273 | .1549 | .290 | .1584 | .308 | .1619 | .325 |
| .1480 | 256 | .1515 | 273 | .1550 | .291 | .1585 | .308 | .1620 | . 326 |
| .1481 | 256 | .1516 | 274 | .1551 | .291 | .1586 | .309 | .1621 | . 326 |
| .1482 | 257 | .1517 | 274 | .1552 | .292 | .1587 | .309 | .1622 | . 327 |
| .1483 | 257 | .1518 | 275 | .1553 | .292 | .1588 | .310 | .1623 | . 327 |
| .1483 | 257 | .1519 | 275 | .1554 | .293 | .1589 | .310 | .1624 | . 328 |
| .1485 .1486 .1487 .1488 .1488 | 258 259 259 260 260 | .1520 .1521 .1522 .1523 .1524 | 276 276 277 277 277 | .1555 .1556 .1557 .1558 .1559 | 293 294 294 295 295 | .1590 .1591 .1592 .1593 .1594 | . 311 . 311 . 312 . 312 . 312 . 313 | .1625 .1626 .1627 .1628 .1629 | . 328 . 329 . 329 . 330 . 330 |
| .1490 | . 261 | .1525 | 278 | .1560 | - 296 | .1595 | .313 | . 1630 | .331 |
| .1491 | . 261 | .1526 | 279 | .1561 | - 296 | .1596 | .314 | . 1631 | .331 |
| .1492 | . 262 | .1527 | 279 | .1562 | - 297 | .1597 | .314 | . 1632 | .332 |
| .1493 | . 262 | .1528 | 280 | .1563 | - 297 | .1598 | .315 | . 1633 | .332 |
| .1494 | . 263 | .1529 | 280 | .1564 | - 298 | .1599 | .315 | . 1634 | .333 |
| .1495 .1496 .1497 .1498 .1499 | - 263 - 264 - 264 - 265 - 265 | -1530 -1531 -1532 -1533 -1534 | .281 .281 .282 .282 .282 .283 | .1565 .1566 .1567 .1568 .1569 | 298 299 299 300 300 | .1600 .1601 .1602 .1603 .1604 | .316 .316 .317 .317 .318 | .1635 .1636 .1637 .1638 .1639 | . 333 . 334 . 334 . 335 . 335 |



| v | | | | | | _ | | | | | | | | | | |
|-----|---------------|---------------------|---------------------------|--------|-----------------|--------|--------|-----------------|---------|----------------------------|--------------|-----------------|----------------|---------------|--------|-------------|
| | AJOR D Max | E IAMETER MIN | NTERNAL PITCH D MAX | | MINOR DI MAX | | | DIAMETER MAX | | THREADS DIAMETER MAX | MINOR MIN | DIAMETER MAX | STRESS AREA | SHEAR AREA | | |
| 0 | . 2500 | 0.2375 | 0.1710 | 0.1530 | 0.0800 | 0.0620 | 0.2700 | 0.2880 | 0.1750 | 0.1930 | 0.1000 | 0.1125 | 0.0091 | 0.2605 | | |
| 0 | . 3750 | 0.3625 | 0.2951 | 0.2764 | 0.2050 | 0.1863 | 0.3950 | 0.4137 | 0.3000 | 0.3187 | 0.2250 | 0.2375 | 0.0420 | 0.4692 | | |
| 0 | . 5000 | 0.4875 | 0.4193 | 0.4001 | 0.3300 | 0.3108 | 0.5200 | 0.5392 | 0.4250 | 0.4442 | 0.3500 | 0.3625 | 0.0992 | 0.6774 | | Þ |
| 0 | . 6250 | 0.6125 | 0.5437 | 0.5239 | 0.4550 | 0.4353 | 0.6450 | 0.6647 | 0.5500 | 0.5697 | 0.4750 | 0.4875 | 0.1806 | 0.8850 | | q |
| . 0 | .7500 | 0.7375 | 0.6681 | 0.6479 | 0.5800 | 0.5598 | 0.7700 | 0.7902 | 0.6750 | 0.3952 | 0.6000 | 0.6125 | 0.2864 | 1.0922 | | oe |
| ٥ | .8750 | 0.8625 | 0.7925 | 0.7719 | 0.7050 | 0.6844 | 0.8950 | 0.9156 | 0.8000 | 0.8206 | 0.7250 | 0.7375 | 0.4164 | 1.2988 | | ppendix |
| 1 | .0000 | 0.9875 | 0.9170 | 0.8960 | 0.8300 | 0.8090 | 1.0200 | 1.0410 | 0.9250 | 0.9460 | 0.8500 | 0.8625 | 0.5708 | 1.5050 | | ix |
| 1 | .1250 | 1.1125 | 1.0415 | 1.0202 | 0.9550 | 0.9336 | 1.1450 |) 1.1664 | 1.0500 | 1.0714 | 0.9750 | 0.9875 | 0.7495 | 1.7107 | | ω |
| 1 | .2500 | 1.2375 | 1.1661 | 1.1443 | 1.0800 | 1.0583 | 1.2700 | 0 1.2917 | 1.1750 | 1.1967 | 1.1000 | 1.1125 | 0.9526 | 1.9160 | 4 Pit | |
| 1 | . 3750 | 1.3625 | 1.2906 | 1.2686 | 1.2050 | 1.1830 | 1.3950 | 0 1.4170 | 1.3000 | 1.3220 | 1.2250 | 1.2375 | 1.1801 | 2.1208 | itch S | B |
| 1 | . 5000 | 1.4875 | 1.4152 | 1.3929 | 1.3300 | 1.3077 | 1.5200 | 1.5423 | 1.4250 | 1.4473 | 1.3500 | 1.3625 | 1.4319 | 2.3253 | itub | Ś |
| 1 | . 6250 | 1.6125 | 1.5398 | 1.5172 | 1.4550 | 1.4324 | 1.6450 | 0 1.6676 | 1.5500 | 1.5726 | 1.4750 | 1.4875 | 1.7082 | 2.5293 | ACI | All |
| 1 | 1.7500 | 1.7375 | 1.6644 | 1.6415 | 1.5800 | 1.5571 | 1.7700 | 0 1.7929 | 1.6750 | 1.6979 | 1.6000 | 1.6125 | 2.0088 | 2.7330 | , an | 0 |
| 1 | 1.8750 | 1.8625 | 1.7890 | 1.7658 | 1.7050 | 1.6818 | 1.895(| 0 1.9182 | 1.8000 | 1.8232 | 1.7250 | 1.7375 | 2.3338 | 2.9363 | ľhre | wa |
| : | 2.0000 | 1.9875 | 1.9137 | 1.8902 | 1.8300 | 1.8065 | 2.0200 | 0 2.0435 | 1.9250 | 1.9485 | 1.8500 | 1.8625 | 2.6833 | 3.1393 | ads | b lo |
| : | 2.1250 | 2.1125 | 2.0383 | 2.0146 | 1.9550 | 1.9313 | 2.1450 | 0 2.1687 | 2.0500 | 2.0737 | 1.975 | 0 1.9875 | 3.0571 | 3.3419 | ^ | еГ |
| : | 2.2500 | 2.2375 | 2.1630 | 2.1390 | 2.0800 | 2.0560 | 2.2700 | 0 2.2940 | 2.1750 | 2.1990 | 2.100 | 2.1125 | 3.4554 | 3.5441 | las | Dia |
| : | 2.3750 | 2.3625 | 2.2877 | 2.2634 | 2.2050 | 2.1808 | 2.395 | 0 2.4192 | 2.3000 | 2.3242 | 2.225 | 0 2.2375 | 3.8780 | 3.7461 | \$ 2G | am |
| 2 | 2.5000 | 2.4875 | 2.4124 | 2.3879 | 2.3300 | 2.3055 | 2.520 | 0 2.5445 | 2.4250 | 2.4495 | 2.350 | 0 2.3625 | 4.3251 | 3.9477 | - | eter |
| : | 2.5250 | 2.6125 | 2.5370 | 2.5123 | 2.4550 | 2.4303 | 2.645 | 0 2.6697 | 2.5500 | 2.5747 | 2.475 | 0 2.4875 | 4.7967 | 4.1490 | | er |
| : | 2.7500 | 2.7375 | 2.6617 | 2.6368 | 2.5800 | 2.5551 | 2.770 | 0 2.7949 | 2.6750 | 2.6999 | 2.600 | 0 2.6125 | 5,2926 | 4.3499 | | Ra |
| : | 2.8750 | 2.8625 | 2.7864 | 2.7613 | 2.7050 | 2.6798 | 2.895 | 0 2.9202 | 2.8000 | 2.8252 | 2.725 | 0 2.7375 | 5.8130 | 4.5506 | | ang |
| | 3.0000 | 2.9875 | 2.9111 | 2.8858 | 2.8300 | 2.8046 | 3.020 | 0 3.0454 | 2.9250 | 2.9504 | 2.850 | 0 2.8625 | 6.3578 | 4.7510 | | ge |
| | 2.1250 | 3.1125 | 3.0359 | 3.0103 | 2.9550 | 2.9294 | 3.145 | 0 3.1708 | 3.050 | 3.0756 | 2.975 | 0 2.9875 | 6.9271 | 4.9511 | | S |
| : | 3.2500 | 3.2375 | 3.1606 | 3.1348 | 3.0800 | 3.0542 | 3.270 | 0 3.2958 | 3.175 | 0 3.2008 | 3.100 | 0 3.1125 | 7.5209 | 5.1509 | | |
| | 3.3750 | 3.3625 | 3.2853 | 3.2593 | 3.2050 | 3.1790 | 3.395 | 0 3.4210 | 3.300 | 0 3.3260 | 3.225 | 0 3.2375 | 8.1389 | 5.3504 | | |
| | 3-5000 | 3.4875 | 3.4100 | 3.3838 | 3.3300 | 3.3038 | 3.520 | 0 3.5462 | 2 3.425 | 0 3.4512 | 3.350 | 0 3.3625 | 8.7815 | 5.5496 | | |
| | 3.3250 | 3.6125 | 3.5348 | 3.5083 | 3.4550 | 3.4286 | 3.645 | 0 3.6714 | 3.550 | 0 3.5764 | 3.475 | 0 3.4875 | 9.4485 | 5.7485 | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

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PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT – APPENDIX 3 July 31, 2009 Page 2 of 5 Revision 0

| ` | / | | | | | | | | | | | | | | | |
|---|--------|-----------------|---------------------------|--------|--------|----------------|--------|----------------|--------|---------------------------------------|---------|---------|----------------|---------------|-------|---------|
| | | DIAMETER MIN | XTERNAL PITCH D MAX | | | IAMETER MIN | - | IAMETER MAX | | · · · · · · · · · · · · · · · · · · · | MINOR D | | STRESS AREA | SHEAR AREA | | |
| | 3,7500 | 3.7375 | 3.6595 | 3.6329 | 3.5800 | 3.5534 | 3.7700 | 3.7966 | 3.6750 | 3.7016 | 3-6000 | 3.6125 | 10.1400 | 5.9473 | | |
| | 3.8750 | 3.8625 | 3.7843 | 3.7574 | 3.7050 | 3.6782 | 3.8950 | 3.9218 | 3.8000 | 3-8268 | 3.7250 | 3.7375 | 10.8559 | 6.1457 | | |
| | 4.0000 | 3.9875 | 3.9090 | 3.8820 | 3.8300 | 3.8030 | 4.0200 | 4.0470 | 3.9250 | 3.9520 | 3.8500 | 3.8625 | 11.5963 | 6.3438 | | |
| | 4.1250 | 4.1125 | 4.0338 | 4.0066 | 3.9550 | 3.9278 | 4.1450 | 4.1722 | 4.0500 | 4.0772 | 3.9750 | 3.9875 | 12.3611 | 6.5418 | | Ap |
| ì | 4.2500 | 4.2375 | 4.1585 | 4.1311 | 4.0800 | 4.0526 | 4.2700 | 4.2974 | 4.1750 | 4.2024 | 4.1000 | 4.1125 | 13.1503 | 6.7394 | | pe |
| ļ | 4.3750 | 4.3625 | 4.2833 | 4.2557 | 4.2050 | 4.1775 | 4.3950 | 4.4225 | 4.3000 | 4.3275 | 4.2250 | 4,2375 | 13.9640 | 6.9368 | | n n |
| | 4.5000 | 4.4875 | 4.4080 | 4.3803 | 4.3300 | 4.3023 | 4.5200 | 4.5477 | 4.4250 | 4.4527 | 4.3500 | 4.3625 | 14.8022 | 7.1340 | | ppendix |
| | 4.6250 | 4.6125 | 4.5328 | 4.5049 | 4.4550 | 4.4271 | 4.6450 | 4.6729 | 4.5500 | 4.5779 | 4.4750 | 4.4875 | 15.6648 | 7.3309 | | ω |
| | 4.7500 | 4.7375 | 4.6576 | 4.6295 | 4.5800 | 4.5519 | 4.7700 | 4.7981 | 4.6750 | 4.7031 | 4.6000 | 4.6125 | 13.5519 | 7.5276 | 4 Pi | I |
| 1 | 4.8750 | 4.8625 | 4.7823 | 4.7541 | 4.7050 | 4.6768 | 4.8950 | 4.9232 | 4.8000 | 4.8282 | 4.7250 | 4.7375 | 17.4635 | 7.7240 | ţ | NB |
| | 5.0000 | 4.9875 | 4.9071 | 4.8787 | 4.8300 | 4.8016 | 5.0200 | 5.0484 | 4.9250 | 4.9534 | 4.8500 | 4.8625 | 18.3995 | 7.9202 | Stut | õ |
| i | 5.1250 | 5.1125 | 5.0319 | 5.0033 | 4.9550 | 4.9264 | 5.1450 | 5.1736 | 5.0500 | 5.0785 | 4.9750 | 4.9875 | 19.3599 | 8.1162 | ð | ≥ |
| 1 | 5.2500 | 5.2375 | 5.1567 | 5.1279 | 5.0800 | 5.0513 | 5.2700 | 5.2987 | 5.1750 | 5.2037 | 5.1000 | 5.1125 | 20.3449 | 8.3119 | Ň | Θ |
| | 5.3750 | 5.3625 | 5.2815 | 5.2525 | 5.2050 | 5.1761 | 5.3950 | 5.4239 | 5.3000 | 5.3289 | 5.2250 | 5.2375 | 21.3543 | 8.5074 | Thr | Wa |
| Ì | 5.5000 | 5.4875 | 5.4062 | 5.3772 | 5.3300 | 5.3009 | 5.5200 | 5.5491 | 5.4250 | 5.4541 | 5.3500 | 5.3325 | 22.3881 | 8.7027 | eads | d |
| , | 5.3250 | 5.6125 | 5.5310 | 5.5018 | 5.4550 | 5.4258 | 5.6450 | 5.6742 | 5.5500 | 5.5792 | 5.4750 | 5.4875 | 23.4464 | 8.8978 | Ň | 0 |
| 1 | 5.7500 | 5.7375 | 5.6558 | 5.6264 | 5.5800 | 5.5506 | 5.7700 | 5.7994 | 5.6750 | 5.7044 | 5.6000 | 5.6125 | 24.5292 | 9.0927 | Clas | |
| | 5.8750 | 5.8625 | 5.7806 | 5.7511 | 5.7050 | 5.6755 | 5.8950 | 5.9245 | 5.8000 | 5.8295 | 5.7250 | 5.7375 | 25.6365 | 9.2873 | \$S 2 | am |
| | 6,0000 | 5.9375 | 5.9054 | 5.8757 | 5.8300 | 5.8003 | 5.0200 | 6.0497 | 5.9250 | 5.9547 | 5.8500 | 5.8625 | 26.7682 | 9,4817 | ရ | let |
| | 6,1250 | 6.1125 | 6.0302 | 6.0004 | 5.9550 | 5.9252 | 6.1450 | 6.1748 | 6.0500 | 6.0798 | 5.9750 | 5.9875 | 27.9244 | 9.6759 | | er |
| | 6.2500 | 6.2375. | 6.1550 | 6.1250 | 6.0800 | 6-0500 | 6.2700 | 6.3000 | 6.1750 | 6.2050 | 6.1000 | 6.1125 | 29.1050 | 9.8699 | | Σ |
| | 6.3750 | 6.3625 | 6.2798 | 6.2497 | 6.2050 | 6.1749 | 6.3950 | 6.4251 | 6.3000 | 6.3301 | 5.2250 | 6.2375 | 30.3101 | 10.0637 | | an |
| | 6.5000 | 6.4875 | 6.4046 | 6.3743 | 6.3300 | 6.2997 | 5.5200 | 6.5503 | 6.4250 | 6.4553 | 6.3500 | 6.3625 | 31.5397 | 10.2573 | | ge |
| | 6.6250 | 6.6125 | 6.5294 | 6.4990 | 6.4550 | 6.4246 | 6-6450 | 6.6754 | 6,5500 | 6-5804 | 6.4750 | 6.4875 | 32.7938 | 10.4507 | | Š |
| | 6.7500 | 6.7375 | 6.6542 | 6.6236 | 6.5800 | 6.5494 | 6.7700 | 6.8006 | 5.6750 | 6.7056 | 6.6000 | 6.6125 | 34.0723 | 10-6439 | | |
| | 6.8750 | 6.8625 | 6.7790 | 6.7483 | 6.7050 | 6.6743 | 6.8950 | 6.9257 | 6.8000 | 6.8307 | 6.7250 | 6.7375 | 35.3753 | 10.8369 | | |
| | 7.0000 | 6.9875 | 6.9038 | 6.B730 | 6.8300 | 6.7991 | 7.0200 | 7.0509 | 6.9250 | 6.9559 | 6.8500 | 6.8625 | 36.7028 | 11.0296 | | |
| | 7.1250 | 7.1125 | 7.0286 | 6.9976 | 6.9550 | 6.9240 | 7.1450 | 7.1760 | 7.0500 | 7.0810 | 6.9750 | .6.9875 | 38.0548 | 11.2222 | | |
| | | | | | | | | | | | | | | | | |

V --- EXTERNAL THREADS -----> <-----> INTERNAL THREADS -----> MINOR DIAMETER STRESS SHEAR MAJOR DIAMETER PITCH DIAMETER MAJOR DIAMETER PITCH DIAMETER MINOR DIAMETER AREA AREA MAX MIN MAX HIN MAX MIN MIN MAX MIN MAX MIN MAX 7.3012 7.1750 7.2062 7.1000 7.1125 39.4312 11.4146 7.2375 7.1535 7.1223 7.0800 7.0488 7.2700 7.2500 7.2375 40.8321 11.6068 7.3625 7.2783 7.2470 7.2050 7.1737 7.3950 7.4263 7.3000 7.3313 7.2250 7.3750 42.2575 11.7988 7.4564 7.3500 7.3625 Appendix 7.5000 7.4875 7.4031 7.3717 7.3300 7.2986 7.5200 7.5514 7.4250 7.4875 43.7073 11.9906 7.5816 7.4750 7.6250 7.6125 7.5279 7.4963 7.4550 7.4234 7.6450 7.6766 7.5500 7.6125 45.1817 12.1822 7.7500 7.7375 7.6527 7.6210 7.5800 7.5483 7.7700 7.8017 7.6750 7.7067 7.5000 7.7375 46.6805 12.3737 7.8625 7.7776 7.7457 7.7050 7.6732 7.8950 7.9268 7.8000 7.8318 7.7250 7.8750 7.9570 7.8500 48.2038 12.5649 B.0000 7.9875 7.9024 7.8704 7.8300 7.7980 8.0200 8.0520 7.9250 7.8625 ω 49.7515 12.7560 8.0821 7.9750 7.9875 8.1250 8.1125 8.0272 7.9951 7.9550 7.9229 8.1450 B.1771 8.0500 Pitch 51.3238 12.9469 8.1125 8.2500 8.2375 8.1520 8.1198 8.0800 8.0478 8.2700 8.3022 8.1750 8.2072 8.1000 52.9205 13.1375 8.2375 8.3750 8.3625 8.2768 8.2445 8.2050 8.1726 8.3950 8.4274 8.3000 8.3324 8.2250 Stub Õ 54.5417 13.3281 8.3625 8.5000 8,4875 8.4017 8.3692 8.3300 8.2975 8.5200 8.5525 8.4250 8.4575 8.3500 Allowable ACME 8.3250 8.6125 8.5265 8.4939 8.4550 8.4224 8.6450 8.6776 8.5500 8.5826 8.4750 8.4875 56.1874 13.5194 57.8575 13.7086 8.5800 8.6125 8,7500 8.7375 8.6513 8.6186 8.5473 8.7700 8.8027 8.6750 8.7077 8.6000 Threads 8.7375 59.5522 13.8985 8.7050 8.8750 8.8625 8.7762 8.7433 8.5721 8.8950 8.9279 8.8000 8.8329 8.7250 9.0000 8.8625 61.2713 14.0883 8.9875 8.8500 8.9010 8.8680 8.8300 8.7970 9.0200 9.0530 8.9250 8,9580 ۸ 9.1250 9.1125 9.0258 8.9927 8.9550 8.9219 9.1450 9.1781 2.0500 9,0831 8.9750 8.9875 63.0149 14.2780 Diameter Class 9.2500 9.2375 9.1125 64.7830 14.4674 9.1507 9.1174 9.0800 9.0468 9.2700 9.3032 9.1750 9.2082 9.1000 2G 9.3750 9.3625 9.2250 9.2375 66.5756 14.6567 9.2755 9.2421 9.2050 9.1716 9.3950 9.4284 9.3000 9.3334 9.4875 9.3500 9.3625 68.3926 14.8458 9-5000 9.4003 9.3668 9.3300 9.2965 9.5200 9.5535 9.4585 9.4250 9.4750 9.4875 9.6250 9.6125 9.5252 9.4916 9.4550 9.4214 9.6450 9.6785 9.5500 9.5836 70.2342 15.0347 Range 9.7500 9.7375 9.6500 9.6000 9.6125 72.1002 15.2235 9.6163 9.5800 9.5463 9.7700 9.8037 9.6750 9.7087 9.8750 9.8625 9.7749 9.7410 9.7050 9.6711 9.8950 9.9289 9.8000 9.8339 9.7250 9.7375 73.9907 15.4121 10.0000 9.9875 9.8997 9.8657 9.8300 9.7960 10.0200 10.0540 9.9250 9.9590 9.8500 9.8625 75.9057 15.6006 10.1250 10.1125 10.0245 9.9905 9.9550 9.9209 10.1450 10.1791 10.0500 10.0841 9.9750 9.9875 77.8452 15.7888 10.2500 10.2375 10.1494 10.1152 10.0800 10.0458 10.2700 10.3042 10.1750 10.2092 10.1000 10.1125 79.8091 15.9769 10.3750 10.3625 10.2742 10.2399 10.2050 10.1707 10.3950 10.4293 10.3000 10.3343 10.2250 10.2375 81,7976 16.1649 10.5000 10.4675 10.3991 10.3646 10.3300 10.2956 10.5200 10.5544 10.4250 10.4594 10.3500 10.3625 83.8105 16.3526 10.5250 10.6125 10.5239 10.4894 10.4550 10.4204 10.6450 10.6796 10.5500 10.5846 10.4750 10.4875 85.8480 16.5403



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PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT – APPENDIX 3 July 31, 2009 Page 3 of 5 Payision 0

Appendix

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Diameter

Ranges

PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT -- APPENDIX 3 July 31, 2009 Page 4 of 5 Revision 0

EXTERNAL THREADS -----> <----> INTERNAL THREADS MAJOR DIAMETER PITCH DIAMETER MINOR DIAMETER MAJOR DIAMETER PITCH DIAMETER MINOR DIAMETER STRESS SHEAR MIN MAX MAX MIN MAX MIN MIN MIN MAX AREA AREA MAX MIN HAX 10.7500 10.7375 10.6488 10.6141 10.5800 10.5453 10.7700 10.8047 10.6750 10.7097 10.6000 10.6125 87.9099 16.7277 10.8750 10.8625 10.7736 10.7388 10.7050 10.6702 10.8950 10.9298 10.8000 10.8348 10.7250 10.7375 89.9963 16.9150 11.0000 10.9875 10.8985 10.8636 10.8300 10.7951 11.0200 11.0549 10.9250 10.9599 10.8500 10.8625 92.1072 17.1021 11.1250 11.1125 11.0233 10.9883 10.9550 10.9200 11.1450 11.1800 11.0500 11.0850 10.9750 10.9875 94.2425 17.2891 11.2500 11.2375 11.1482 11.1130 11.0800 11.0449 11.2700 11.3051 11.1750 11.2101 11.1000 11.1125 96.4024 17.4759 11.3750 11.3625 11.2730 11.2378 11.2050 11.1698 11.3950 11.4302 11.3000 11.3352 11.2250 11.2375 98.5867 17.6626 11.5000 11.4875 11.3979 11.3625 11.3300 11.2947 11.5200 11.5553 11.4250 11.4603 11.3500 11.3625 100.7956 17.8491 11.6250 11.6125 11.5227 11.4873 11.4550 11.4195 11.6450 11.6805 11.5500 11.5855 11.4750 11.4875 103.0289 18.0354 4 Pitch S 11.7500 11.7375 11.6476 11.6120 11.5800 11.5444 11.7700 11.8056 11.6750 11.7106 11.6000 11.6125 105.2867 18.2216 11.8750 11.8625 11.7724 11.7368 11.7050 11.6693 11.8950 11.9307 11.8000 11.8357 11.7250 11.7375 107.5690 18.4077 Ť 12.0000 11.9875 11.8973 11.8615 11.8300 11.7942 12.0200 12.0558 11.9250 11.9608 11.8500 11.8625 109.8758 18.5936 ACME 12.1250 12.1125 12.0221 11.9863 11.9550 11.9191 12.1450 12.1809 12.0500 12.0859 11.9750 11.9875 112.2071 18.7793 12.2500 12.2375 12.1470 12.1110 12.0800 12.0440 12.2700 12.3060 12.1750 12.2110 12.1000 12.1125 114.5629 18.9649 Threads 12.3750 12.3625 12.2719 12.2358 12.2050 12.1689 12.3950 12.4311 12.3000 12.3361 12.2250 12.2375 116.9432 19.1503 12.5000 12.4875 12.3967 12.3605 12.3300 12.2938 12.5200 12.5562 12.4250 12.4612 12.3500 12.3625 119.3479 19.3356 12.6250 12.6125 12.5216 12.4853 12.4550 12.4187 12.6450 12.6813 12.5500 12.5863 12.4750 12.4875 121.7772 19.5207 Class 12.7500 12.7375 12.6464 12.6100 12.5800 12.5436 12.7700 12.8064 12.6750 12.7114 12.6000 12.6125 124.2309 19.7057 12.8750 12.8625 12.7713 12.7348 12.7050 12.6685 12.8950 12.9315 12.8000 12.8365 12.7250 12.7375 126.7092 19.8906 ß 13.0000 12.9875 12.8962 12.8595 12.8300 12.7934 13.0200 13.0566 12.9250 12.9616 12.8500 12.8625 129.2119 20.0752 13.1250 13.1125 13.0210 12.9843 12.9550 12.9183 13.1450 13.1817 13.0500 13.0867 12.9750 12.9875 131.7391 20.2598 13.2500 13.2375 13.1459 13.1090 13.0800 13.0432 13.2700 13.3068 13.1750 13.2118 13.1000 13.1125 134.2908 20.4442 13.3750 13.3625 13.2707 13.2338 13.2050 13.1681 13.3950 13.4319 13.3000 13.3369 13.2250 13.2375 136.8670 20.6284 13.5000 13.4875 13.3956 13.3586 13.3300 13.2930 13.5200 13.5570 13.4250 13.4620 13.3500 13.3625 139.4677 20.8126 13.6250 13.6125 13.5205 13.4833 13.4550 13.4179 13.6450 13.6821 13.5500 13.5871 13.4750 13.4875 142.0929 20.9965 13.7500 13.7375 13.6453 13.6081 13.5800 13.5428 13.7700 13.8072 13.6750 13.7122 13.6000 13.6125 144.7426 21.1804 13.8750 13.8625 13.7702 13.7329 13.7050 13.6677 13.8950 13.9323 13.8000 13.8373 13.7250 13.7375 147.4168 21.3640 14.0000 13.9875 13.8951 13.8576 13.8300 13.7926 14.0200 14.0574 13.9250 13.9624 13.8500 13.8625 150.1155 21.5476 14.1250 14.1125 14.0199 13.9824 13.9550 13.9175 14.1450 14.1825 14.0500 14.0875 13.9750 13.9875 152.8386 21.7310

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Appendix

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Allowable

Diameter

Ranges

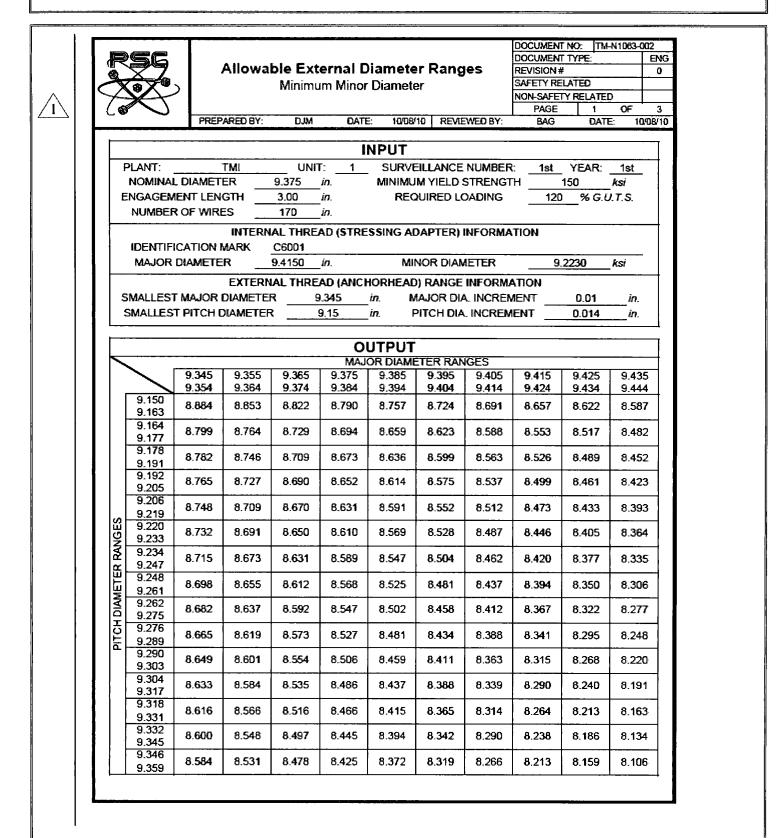
4 Pitch Stub ACME Threads < Class 2G >

PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT – APPENDIX 3 July 31, 2009 Page 5 of 5 Revision 0

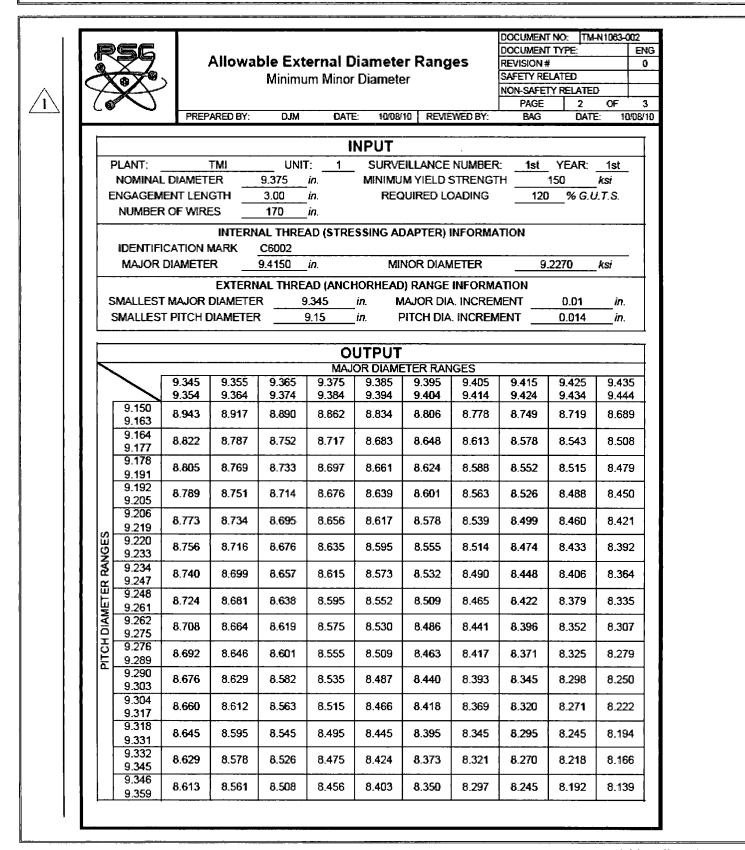
EXTERNAL THREADS ----- INTERNAL THREADS --> MINOR DIAMETER STRESS SHEAR MAJOR DIAMETER PITCH DIAMETER MINOR DIAMETER MAJOR DIAMETER PITCH DIAMETER AREA AREA MAX MIN MAX MAX MIN MAX MIN MAX MIN HIN HAX: MIN 14.2500 14.2375 14.1448 14.1072 14.0800 14.0424 14.2700 14.3076 14.1750 14.2126 14.1000 14.1125 155.5863 21.9142 14.3750 14.3625 14.2697 14.2319 14.2050 14.1673 14.3950 14.4327 14.3000 14.3377 14.2250 14.2375 158.3584 22.0974 14.5000 14.4875 14.3945 14.3567 14.3300 14.2922 14.5200 14.5578 14.4250 14.4628 14.3500 14.3625 161.1551 22.2803 14.8250 14.6125 14.5124 14.4815 14.4550 14.4171 14.6450 14.8829 14.5500 14.5979 14.4750 14.4875 163.9762 22.4632 14.7500 14.7375 14.6443 14.6062 14.5800 14.5420 14.7700 14.8080 14.6750 14.7130 14.6000 14.6125 166.8219 22.6459 14.8750 14.8625 14.7691 14.7310 14.7050 14.6669 14.8950 14.9331 14.8000 14.8381 14.7250 14.7375 169.6920 22.8284 15.0000 14.9875 14.8940 14.8558 14.8300 14.7918 15.0200 15.0582 14.9250 14.9632 14.8500 14.8625 172.5867 23.0109 15.1250 15.1125 15.0189 14.9806 14.9550 14.9167 15.1450 15.1833 15.0500 15.0883 14.9750 14.9875 175.5058 23.1932 15.2500 15.2375 15.1438 15.1053 15.0800 15.0416 15.2700 15.3084 15.1750 15.2134 15.1000 15.1125 178.4494 23.3753 15.3750 15.3625 15.2686 15.2301 15.2050 15.1665 15.3950 15.4335 15.3000 15.3385 15.2250 15.2375 181.4175 23.5574 15.5000 15.4875 15.3935 15.3549 15.3300 15.2914 15.5200 15.5586 15.4250 15.4636 15.3500 15.3625 184.4102 23.7392 15. 6250 15. 6125 15. 5184 15. 4797 15. 4550 15. 4163 15. 6450 15. 6837 15. 5500 15. 5887 15. 4750 15. 4875 187. 4273 23. 9210 15.7500 15.7375 15.6433 15.6044 15.5800 15.5412 15.7700 15.8088 15.6750 15.7138 15.6000 15.6125 190.4689 24.1026 15.8750 15.8625 15.7681 15.7292 15.7050 15.6661 15.8950 15.9339 15.8000 15.8389 15.7250 15.7375 193.5350 24.2841 16.0000 15.9875 15.8930 15.8540 15.8300 15.7910 16.0200 16.0590 15.9250 15.9640 15.8500 15.8625 196.6256 24.4655

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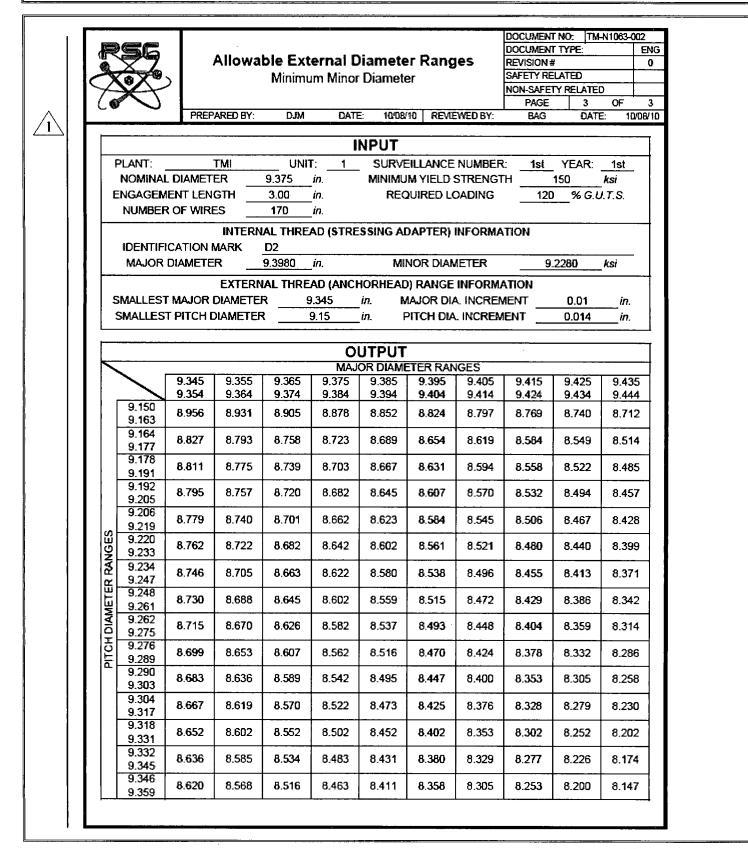
PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT – APPENDIX 4 July 31, 2009 Page 1 of 3 Revision 0 Revision 1, 10/13/10



PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT - APPENDIX 4 July 31, 2009 Page 2 of 3 Revision 0 Revision 1, 10/13/10



PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT – APPENDIX 4 July 31, 2009 Page 3 of 3 Revision 0 Revision 1, 10/13/10





| UNIT 1 | EXELON REE MILE ISLAND (35 TH YEAR) PHYSICAL JILDING TENDON SURVEILLANC | E | | | | | | |
|--|---|------------------|--|--|--|--|--|--|
| PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE | | | | | | | | |
| PRESTRESS FORCES | | | | | | | | |
| PR | ESTRESS FORCES | | | | | | | |
| PR | ESTRESS FORCES QA MANAGER | 10/13/10 | | | | | | |
| PR Abussine Prepared by | | 10/13/10 Date | | | | | | |
| Prepared by | QA MANAGER | | | | | | | |
| Abussone | QA MANAGER Title | Date | | | | | | |
| Hourson Prepared by Chiloph E. Co | QA MANAGER Title PROJECT MANAGER, P.E. | Date 10/13/10 | | | | | | |



1.0 PURPOSE

1.1 The purpose of this procedure is to provide in table form the predicted lift-off forces for the 35th Year In-Service Inspection (surveillance) at Exelon's Three Mile Island Nuclear Plant.

2.0 SURVEILLANCE TENDON DATA

- 2.1 The lower limit lift-off forces, 95% lift-off force, 90% lift-off force and Normalization Factor have been obtained from Exelon.
- 2.2 The predicted lower limit (PLL), 90% of predicted lower limit (.9 PLL), 95% of predicted lower limit (.95PLL) and Normalization Factor forces to be used during the 2010 Augmented inspection are listed below for each UNIT 1 tendon scheduled for monitoring of force. The same information is provided for the adjacent tendons.

| Tabl | e 2-3 : T | MI – SG | 9.1: Li | ftoff Calc | ulations – | Unit 1 A | ugmen | ted Ten | dons |
|--------|---------------------------------------|--|--|-------------------------|------------|---------------------------------------|--|--|-------------------------|
| TENDON | LOWER LIMIT LIFTOFF FORCE (PLL) | 95% LOWER LIMIT LIFTOFF FORCE (.95PLL) | 90% LOWER LIMIT LIFTOFF FORCE (.90PLL) | NORMALIZATION FACTOR | TENDON | LOWER LIMIT LIFTOFF FORCE (PLL) | 95% LOWER LIMIT LIFTOFF FORCE (.95PLL) | 90% LOWER LIMIT LIETOFF FORCE (.90PLL) | NORMALIZATION FACTOR |
| H46-37 | 1312 | 1246 | 1181 | n/a | V-117 | 1330 | 1264 | 1197 | n/a |
| H46-38 | 1239 | 1177 | 1115 | n/a | V-118 | 1340 | 1273 | 1206 | n/a |
| H46-39 | 1316 | 1250 | 1184 | n/a | V-119 | 1308 | 1243 | 1177 | n/a |
| H46-40 | 1218 | 1157 | 1096 | n/a | V-133 | 1352 | 1284 | 1217 | n/a |
| H46-41 | 1314 | 1248 | 1183 | n/a | V-134 | 1332 | 1265 | 1199 | n/a |
| H46-42 | 1222 | 1161 | 1100 | n/a | V-135 | 1356 | 1288 | 1220 | n/a |

N/A- NORMALIZATION NOT REQUIRED



PSC PROCEDURE SQ 10.2 TEST WIRE REMOVAL July 31, 2009 Page 1 of 6 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

TEST WIRE REMOVAL

pared by

oved by

Title

hoproved b١

PRESIDENT Title

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

07/31/09 Date

07/31/09

Date

07/31/09

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 35th 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 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 <u>HOLD POINTS</u>. The work shall not progress past or through a <u>HOLD POINT</u> without a sign-off from the QC Inspector. All Quality Control Documentation (<u>QCD</u>) 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 the yield strength 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 <u>**QCD**</u> 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.
- 8.5.4.1.1 <u>**HOLD POINT**</u> 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 TMI Procedure 1301-9.1, 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.



PSC PROCEDURE SQ 10.2 TEST WIRE REMOVAL July 31, 2009 Page 5 of 6 Revision 0

8.5.4.4 WIRE SAMPLE QUANTITY AND LOCATION REQUIREMENTS

8.5.4.4.1 <u>ACCEPTABLE WIRE</u>

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 **<u>QCD</u>** 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 **<u>QCD</u>** 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, using the appropriate Code Symbol. Document the posting of this information on Data Sheet 10.2.
- 8.8 **<u>QCD</u>** 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 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 <u>QCD</u> or <u>HOLD POINT</u>.

10.0 ATTACHMENTS

10.1 Data Sheet 10.2

| | | P | SC PROCEDURE SQ10.2 TEST WIRE REMOVAL Data Sheet 10.2 July 31, 2009 Page 1 of 1 Revision 0 |
|---|---|------------------------------------|---|
| Project:TMI 35 TH | YEAR TENDON SURVEILLANCE | UNIT 1 | |
| Tendon No.: Removal Date: | Tendon End: Inspection Date: | Shop | Field |
| | WIRE REMOVAL INS | SPECTION | |
| (8.5.4.1.1) Document th For Corrosion Level E c (8.5.4.3.1) Document th | TION @ LENGTH INTERVALS e Corrosion Category for each 10' of wire in the incre locument condition on an NCR. he total length of the wire on the diagram below. | NCR Req'd: 🗌 NO 🗌 YES | ibed in PSC SQ 8.0. NCR# ☐ NO ☐ YES |
| 0' | 10' | 20' | 30' |
| 30' | 40' | 50' | 60' |
| 60' | 70' | 80' | 90' |
| 90' | 100' | 110' | 120' |
| 120' | 130' | 140' | 150' |
| 150' | 160' | 170' | 180' |
| 180' | 190' | 200' | 210' |
| 210' | 220' | 230' | 240' |
| 240' | 250' | 260' | 270' |
| 270' | 280' | 290' | 300' |
| 300' | 310' | 320' Cut E | 330' nd |
| (8.5.4.6.2) Was the wire | cut for samples: , 		NO | area of removal above using symbol | x . |
| (8.7) Document the loca | ation of wire removed on Data Sheet 8.0, ANCHORA | | eted |
| (8.8) Measuring Device: | | Recal Date: | : |
| (8.8) Wire Pull Ram ID N | lumber: | _ | |
| Q.C Inspector: | Level: | Date: | |
| QC Reviewed | Level: | Date: | |



PSC PROCEDURE SQ 10.3 TESTING TENDON WIRES July 31, 2009 Page 1 of 6 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

TESTING TENDON WIRES

<u>Frepared by</u>

Christoph E. Con

Approved by

Doroved by

PROJECT MANAGER, P.E. 07/31/09 Title Date

PRESIDENT Title

Q.A. MANAGER

Title

07/31/09 Date

07/31/09

Date

22 SQ 10.3 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 276 of 523



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 35th 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.

3.0 **RESPONSIBILITY**

3.1 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 Steel tapeline, steel ruler, 1" O.D. Micrometer, Wire Test Apparatus, Pressure Gauge, dial indicator.

6.0 QUALITY CONTROL

6.1 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 10.3.

7.0 PRECAUTIONS

- 7.1 Stay clear of the test apparatus while the wire is being tensioned.
- 7.2 Always maintain identification control of the samples including tendon and end identification, plant name and unit, the direction of removal of the wire and the location of that sample as it was removed from the tendon wire.
- 7.2.1 As a means of maintaining consistency for testing, the end of the sample that is tagged (closest to pulling or buttonhead end) shall always be placed into the Wire Test Apparatus (Figure D 1) opposite or away from the ram end.



PSC PROCEDURE SQ 10.3 TESTING TENDON WIRES July 31, 2009 Page 3 of 6 Revision 0

8.0 PHYSICAL TESTING

- 8.1 The following steps shall be used to test any tendon wire removed from the tendon, whether that is an acceptable wire, a broken wire or a wire of an unacceptable category of corrosion.
- 8.2 The specimen wires will be cut to a length of 108" plus or minus 1/4", after being removed during the performance of PSC Procedure SQ 10.2. Develop a separate Data Sheet for each sample tested. It will be acceptable to cut the sample to the Buttonheading Length of 101 inches plus or minus one inch. (See Section 8.7 of this Procedure.)

8.3 ACCEPTABLE WIRE

8.3.1 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.

8.4 BROKEN WIRE

8.4.1 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 UNACCEPTABLE CATEGORY OF CORROSION CONDITION

- 8.5.1 If unacceptable category of corrosion condition wires require testing, at least one specimen shall be tested, with that sample being taken from the worst representative section of the wire length. Other samples may be selected and/or tested at the request of Exelon.
- 8.5.2 **<u>QCD</u>** Document the sample number, wire identification, location of removal and overall length on Data Sheet 10.3 from Data Sheet 10.2 of PSC Procedure SQ 10.2.
- 8.6 Measure the diameter of the wire test sample in 3 locations, each end and the middle.
- 8.6.1 <u>**QCD**</u> Document the measurement of the wire test sample and the measuring device on Data Sheet 10.3. Calculate and document the average of the 3 measurements.
- 8.7 Cut each wire test sample to 101" plus or minus 1" long; this must be a square, neat cut to permit buttonheading.



- 8.8 Slide two Wire Test Stressing Washers (see Figure D 2) onto the wire, making sure the chamfered seats face to the outside of the wire.
- 8.9 Buttonhead both ends of the wire.
- 8.9.1 **QCD** Document the acceptance of the buttonheads on Data Sheet 10.3 using the buttonhead acceptance criteria shown in PSC Procedure SQ 8.0.
- 8.10 Measure the Gauge length of the wire from inside of the buttonhead at one end to the inside of the buttonhead at the other end within an accuracy of plus or minus 0.05".
- 8.10.1 **<u>QCD</u>** Document the Gauge length of the wire and the identification and recalibration date for the measuring device.
- 8.11 Place the specimen into the Wire Test Apparatus and check for proper seating of the Stressing Washers in the pulling adaptors.
- 8.12 Preload the wires to about 2.45 kips +0/-10% to seat the buttonheads in the Stressing Washers.
- 8.12.1 **QCD** Document the preloading pressure and force, the identification and recalibration date of the Wire Test Apparatus components.

8.12.2 To obtain pressure when the force is specified: $F = \frac{P \times A}{1000} + K$

- 8.13 Reduce the preload force to 0 kips.
- 8.13.1 **<u>QCD</u>** Document the release of the preload force.
- 8.14 Load the wire to 1.42 kips plus or minus 5%. This will provide 0.1% elongation.
- 8.14.1 **<u>QCD</u>** Document the initial loading of the wire in force, pressure and actual elongation at this point. Elongation shall be measured to an accuracy of 0.05".
- 8.15 Preset the Dial Indicator on the Wire Test Apparatus to measure 0.9% elongation. (0.9" for a sample length of 100")
- 8.15.1 **<u>QCD</u>** Document the setting of the Dial Indicator as well as the indicator id and calibration due date.
- 8.16 Load the wire until the Dial Indicator shows signs of movement, signaling the 0.9% elongation (pressure at 1% elongation).
- 8.16.1 **<u>QCD</u>** Document the force and pressure at 1% elongation.
- 8.17 Remove the Dial Indicator.



- 8.17.1 **<u>QCD</u>** Document the "Rule" dimension reading at 1% elongation (approximately 1") to an accuracy of 0.05".
- 8.18 Continue to load the wire to failure.
- 8.18.1 **QCD** Document the maximum elongation measurement from the "Rule" to accuracy of 0.05".
- 8.18.2 **<u>QCD</u>** Document the maximum force and pressure reading at failure.
- 8.19 Remove the sample wire (two pieces) and remove the Stressing Washers.
- 8.20 **<u>QCD</u>** Document the type of failure, ductile or brittle, and the location of the wire break from the tagged end of the wire (opposite the ram).
- 8.21 Calculate the following and document on Data Sheet 10.3.
- 8.21.1 **QCD** Calculate the ultimate stress.
- 8.21.1.1 Stress in KSI is calculated by dividing the Force in KIPS by the wire Area (when the Force in KIPS is derived by the formula: Ram Area in square inches, multiplied by Gauge Pressure in psi and dividing by 1000 and adding the RAM "K" Factor.)
- 8.21.1.2 Stress (ksi) = Force (kips) + Area (in²)
- 8.21.2 **QCD** Calculate yield stress from the pressure reading at 1% elongation.
- 8.21.3 **<u>QCD</u>** Calculate the percent of elongation under load at the point of failure, based on the actual Gauge length of the wire.
- 8.21.4 **QCD** Document the acceptability of the wire test in accordance with the criteria specified below in Section 9.0.

9.0 NOTIFICATION - UNACCEPTABLE CONDITIONS

- 9.1 Exelon shall be notified with a nonconformance report when each one or more of the following unacceptable conditions are detected as a result of the inspection or Physical Testing of a Tendon Wire.
- 9.2 The diameter of the wire is less than 0.248 in or greater than 0.252 in.
- 9.3 The Category of Corrosion of the wire is "Active" as described in TMI Procedure 1301-9.1.
- 9.4 The wire fails to meet the ultimate strength of 240,000 psi.
- 9.5 The elongation at failure of a tendon wire test is less than 4%.



10.0 DOCUMENTATION

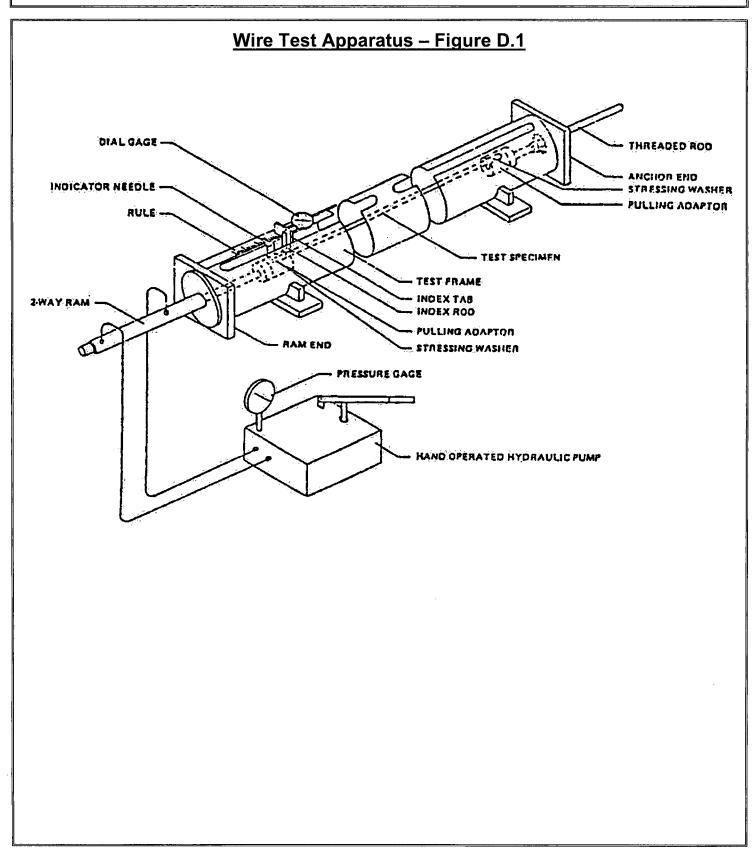
- 10.1 The items in this procedure requiring documentation shall be documented on Data Sheet 10.3.
- 10.2 The Data Sheet references the applicable section number of the procedure for each *QCD* Point.
- 10.3 Some information from Data Sheet 10.2 of PSC Procedure SQ 10.2 shall require posting to Data Sheet 10.3.

11.0 ATTACHMENTS

- 11.1 Data Sheet 10.3
- 11.2 Figure D.1
- 11.3 Figure D.2

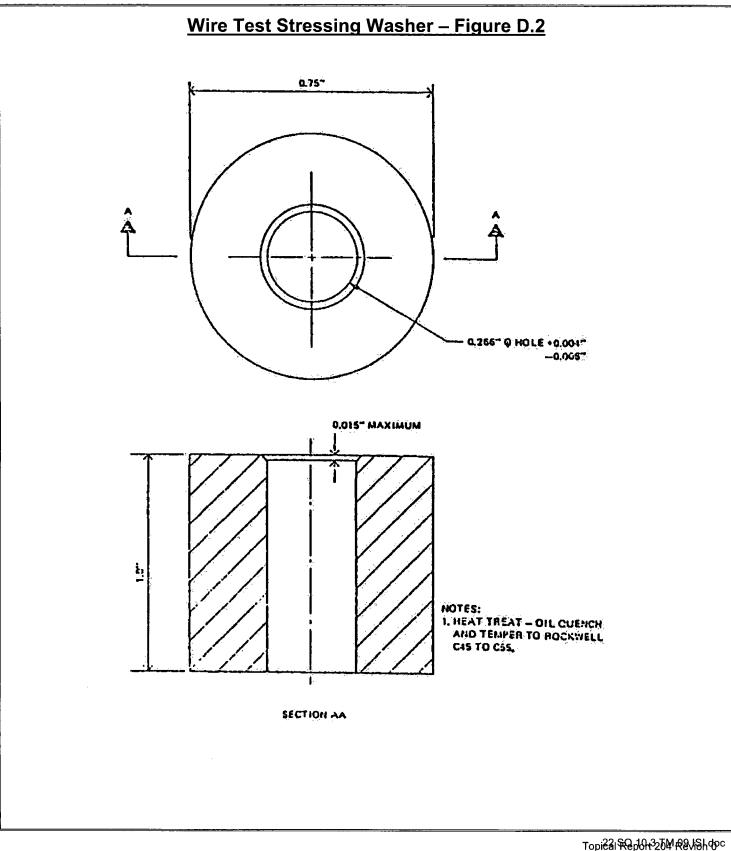
| | | | | TESTING T | DURE SQ 10.3 ENDON WIRES Data Sheet 10.3 July 31, 2009 Page 1 of 1 Revision 0 |
|---|-------------------|---------------------|-------------|----------------------|--|
| Project: TMI 35 TH YEA Tendon No.: | R TENDON SU | RVEILLANCE | · · · | _ [] UNIT 1 | |
| Ŵ | IRE TEST DO | CUMENTATIO | N | | |
| (8.5.2) Sample No.: | | | | | |
| Wire ID and Location of removal: | | feet | Leng | ath: | in. |
| (8.6.1) Wire Diameters: Tag End | in. Middle | | Ram End | in. Avg. | in. |
| Measuring Device ID: | | | Recal Date: | | |
| (8.9.1) Buttonhead Inspection: Tag End | b | | Ram End | | |
| (8.10.1) Gauge Length of Wire: in. | Measuring De | evice ID: | | Recal Date: | |
| (8.12.1) Preload force: kips | | | | | |
| Preload pressure: psi | Pressure Ga | auge ID: | | Recal Date: | |
| Ram ID: Ram Are | a:i | in ² K = | kips | Recal Date: | |
| (8.13.1) Force reduced to zero (0): | | | | | |
| (8.14.1) Initial load of wire force: | kips | (0.1% elonga | tion) | | |
| Initial load of pressure: | psi | Elonga | tion: | in. | |
| (8.15.1) Preset Dial Indicator: | (0.9% elongation) | Indicator ID: | | Recal Date: | |
| (8.16.1) Force at 1% elongation: | kips | Pressure: | | psi | |
| (8.17.1) "Rule" reading measurement at 1% elongati | on: | | in. | | |
| (8.18.1) Maximum elongation at failure, from "Rule" r | eading: | | in. | | |
| (8.18.2) Maximum force at failure: | kips | Press | sure: | psi | |
| (8.20) Type of break: | | Location of br | eak: | in. | |
| CALCULATIONS: | | | | | _ |
| · · · · | si | | | (kips) + [π (dia²)÷ | , |
| (8.21.2) Yield Stress @ 1% elongation: | ks | | | kips) @ 1% ÷ [π (| , . , |
| (8.21.3) % elongation @ failure: | <u>%</u> | | | ailure – "Rule" Dime | nsion @ 1%)] |
| (8.21.4) Results: Acceptable Unaccep | table Custo | omer Notified NC | R No.: | | |
| QC Inspector: | | Level: | | Date: | |
| QC Reviewed: | | _ Level: | | Date: | |

PSC PROCEDURE SQ 10.3 TESTING TENDON WIRES Figure D.1 July 31, 2009 Page 1 of 1 Revision 0



PSC PROCEDURE SQ 10.3 TESTING TENDON WIRES Figure D.2 July 31, 2009 Page 1 of 1 Revision 0







PSC PROCEDURE SQ 10.5 CONTINUITY TEST July 31, 2009 Page 1 of 4 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

CONTINUITY TEST

Teal Busso Prepared by

broved by

Approved by

Q.A. MANAGER Title

PROJECT MANAGER, P.E.

Title

PRESIDENT

Title

07/31/09

Date

07/31/09

Date

07/31/09

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 25th 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 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 <u>HOLD POINTS</u>. All Quality Control Documentation (<u>QCD</u>) 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 A tapeline shall be the only equipment required to perform the Continuity Test, except where calibrated hydraulic devices and gauges are used.

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 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 **<u>QCD</u>** 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 <u>**QCD**</u> 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 **<u>QCD</u>** 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 TMI Procedure 1301-9.1. Also document, where possible, the reason for breaking.
- 9.5.2 <u>**QCD**</u> 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. 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 **<u>QCD</u>** If any or all the Protruding/Unseated wires remain unseated after Retensioning, it shall be reported as required of TMI Procedure 1301-9.1.
- 9.6 **<u>QCD</u>** 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.

11.0 ATTACHMENTS

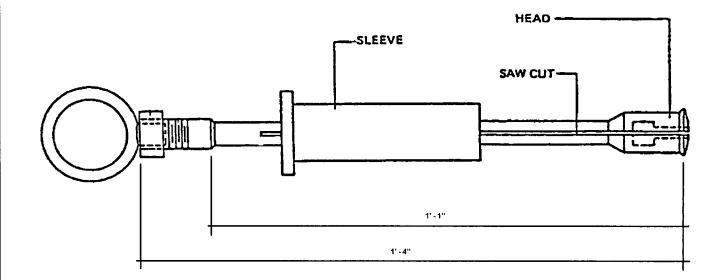
- 11.1 Data Sheet 10.5
- 11.2 Figure 1.0 Tendon Wire Puller

| | | | PSC PF | COCEDURE SQ 10.5 CONTINUITY TEST Data Sheet 10.5 July 31, 2009 Page 1 of 1 Revision 0 |
|---|----------------------|---|---|--|
| Project: TMI 35 TH Y | EAR TENDON SURVEILLA | NCE | UNIT 1 | |
| (8.6)Tendon No.: | Tendor | n End: | Shop 🗌 | Field |
| | CONTINU | ITY TEST DOCL | JMENTATION | |
| (9.1.1) Wire No.(9.3.3.2) Force if greater than 9,425 lbsContinuous (9.4.1) Yes(9.5.2) Corrosion Condition | | (9.5.2.3) Broken & Posted to D.S. 8.0 | (9.6) Comments | QC Signoff |
| | | | | |
| | | | ark each wire with a number corresponding to ea is to be used to identify any nonconforming | |
| | | Row Wire 1 7 2 8 3 11 4 12 5 13 6 14 9 13 10 14 11 13 12 12 13 11 14 8 15 7 | This form can be u to 17 individual win fashion. If more the verified or if the en verified, then a row inspection shall be Orient the anchora the Heat Code Ide note the wire numl in each row startin side of each row. | ised to verify up res in columnar an 17 are to be tire row is to be v by row performed. age sketch with ntification and ber as it appears g from the left a shall be used to vires or provide |
| Q.C Inspector QC Reviewed | | | vel: 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.





| UNIT 1 (: | EXELON REE MILE ISLAND 35 TH YEAR) PHYSICAL ILDING TENDON SURVEILLANCI | Ē |
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| IN-SE | RVEILLANCE CORPORATION RVICE INSPECTION CONTROL PROCEDURE | |
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| PSC E | ENGINEERING DATA | |
| PSC E | ENGINEERING DATA QA MANAGER | 10/13/10 |
| PSC E Bussone Prepared by | | 10/13/10 Date |
| Abussone | QA MANAGER | |
| Prepared by | QA MANAGER Title | Date |
| Albussone Prepared by Chityph E. Co | QA MANAGER Title PROJECT MANAGER, P.E. | Date 10/13/10 |



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. 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. This might not be the same Overstress Force identified as the "DO NOT EXCEED FORCE". The Overstress Force for this surveillance will be the same as used for the Original Installation and shall be based on 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.



/T

PSC PROCEDURE SQ 11.1 **PSC ENGINEERING DATA** July 31, 2009 Page 3 of 4 Revision 0 Revision 1, 10/13/10

| | Та | ble 3-1: | TMI – S | Q 11.1 I | Restres | sing Dat | ta – Uni | t 1 | |
|---|--------------------|--|--------------------|--------------------|-------------------|-------------------|------------------|-------------------|------------------------|
| 1 K K K K | PR | EVIOUS | LY | AT RETENSIONING | | | | 1 m 1 1 | z |
| TENDON NUMBER OF WIRES | NUMBER OF WIRES | ORIG PTF (kips) | ORIG OSF (kips) | NUMBER OF WIRES | NEW PTF (kips) | NEW OSF (kips) | 650 kips (in) | 1100 kips (in) | ORIGINAL ELONGATION |
| | | | | 168 | 207 | 1555 | 3.32 | 6.69 | |
| H51-49 | 169 | 208.3 | 1564 | 167 | 206 | 1545 | 3.35 | 6.74 | 10.1 |
| | | | | 166 | 205 | 1536 | 3.38 | 6.79 | |
| n - e a - e - e - e - e - e - e - e - e - | | Alexandron and provide the second sec | | 168 | 207 | 1469 | 4.33 | 8.74 | |
| V-90 | 169 | 208.3 | 1478 | 167 | 206 | 1460 | 4.37 | 8.80 | 12.35 |
| | • | | | 166 | 205 | 1452 | 4.41 | 8.87 | , |
| | | | | 168 | 207 | 1528 | 3.59 | 7.23 | |
| D-322 | 169 | 208.3 | 1537 | 167 | 206 | 1519 | 3.62 | 7.29 | 10.7 |
| | | | | 166 | 205 | 1510 | 3.65 | 7.34 | |
| | | | | 168 | 198.0 | 1572.5 | 4.60 | 9.19 | |
| V-118 | 169 | 199.2 | 1581.9 | 167 | 196.8 | 1563.2 | 4.64 | 9.25 | 14.00 |
| | | 1 1 5 88.1 | | 166 | 195.7 | 1553.8 | 4.68 | 9.32 | |
| | | | | 168 | 198.8 | 1579.2 | 3.45 | 6.89 | |
| H46-39 | 169 | 200.0 | 1588.6 | 167 | 197.6 | 1569.8 | 3.48 | 6.94 | 10.56 |
| | | | | 166 | 196.4 | 1560.4 | 3.51 | 7.00 |] |

3.0 RETENSIONING DATA

3.1 NOTES CONCERNING ELONGATION DATA

- 3.1.1 The tendons for this project were based on 169 wires.
- 3.1.2 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.
- 3.1.3 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.



- 3.1.4 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.
- 3.2 FORCES DURING SURVEILLANCE
- 3.2.1 Overstress (OSF) during Retensioning:

(OSF at Installation)×(# of Wires during Retension) #of Wires during Installation

3.2.2. Pre-Tensioning (PTF) during Retensioning:

(PTF at Installation)×(# of Wires during Retension) #of Wires during Installation

- 3.3 USE OF "K" (CONSTANT)
- 3.3.1 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.

3.4 FORMULA AND WORKING RELATIONSHIPS

3.4.1 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.)

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



PSC PROCEDURE SQ 12.0 REPLACE GREASE CAP July 31, 2009 Page 1 of 5 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

GREASE CAP REPLACEMENT

| QA MANAGER | 07/31/09 |
|--------------------------------|---|
| Title | Date |
| PROJECT MANAGER, P.E. Title | 07/31/09 Date |
| PRESIDENT | 07/31/09 Date |
| THE | Date |
| | |
| | Title PROJECT MANAGER, P.E. Title |



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 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 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 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:
- 8.3.1 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 Take precautions to keep dirt and other foreign material out of the tendon, and from the inside of the trumpet and conduit.
- 8.3.3 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.
- 8.3.4 Remove sharp edges, and smooth down remaining mill scale to a "feather-edge".
- 8.4 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.
- 8.4.1 Smooth out epoxy to prevent grease leakage under the gasket.
- 8.5 Remove all dust and loose mater from the vicinity of the tendon and entrance to the trumplet.
- 8.6 Clean any foreign material from the threaded bearing plate grease cap mounting holes.
- 8.7 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.
- 8.8 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.
- 8.9 Clean and dry the flange and gasket sealing surface of the grease cap.
- 8.10 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.
- 8.11 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.



- 8.12 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.
- 8.13 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.
- 8.14 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.
- 8.15 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.
- 8.16 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.
- 8.17 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.
- 8.18 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.
- 8.19 Reckeck that the gasket has not slipped or become crimped and that the tendon end cap and hold down bolts are aligned properly.
- 8.20 Tighten each bolt, equalizing the load on each as much as possible, to evenly compress the gasket by approximately 1/8".
- 8.21 Apply a new wrapping of teflon tape to the grease cap filler bushing prior to final insertion and tightening.
- 8.22 Record on Data Sheet SQ 12.0, the completeness of the installation and that the bolts were tightened in incremental passes.
- 8.23 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.

| RSC or | > | | PSC PROCEDURE SQ 12.0 REPLACE GREASE CAP Data Sheet 12.0 July 31, 2009 Page 1 of 1 Revision 0 |
|-------------|---|----------|--|
| Project: T | /II 35 TH YEAR TENDON SURVEILLANCE | <u></u> | |
| Tendon No.: | Tendon End: | S | hop 🗌 Field |
| | ANCHORAGE INSPECTION | CRITERIA | |
| | BEARING PLATE SURFACE PROPERLY PREPAREI | D: YES | |
| | GREASE CAP SURFACE PROPERLY PREPARED: | 🗌 YES | □ NO |
| | GASKET MATING SURFACE PROPERLY PREPARE | D: 🗌 YES | □ NO |
| | STUD/BOLT HOLES PROPERLY PREPARED: | ☐ YES | □ NO |
| | FOREIGN MATERIAL EXCLUSION CONTROLLED: | T YES | □ NO |
| | | | |
| CREW FOR | EMAN SIGNOFF | | Date: |
| QC Review | ed: | Level: | Date: |



EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

GREASE REPLACEMENT

Prepared by

Approved by

Title

QA MANAGER

PROJECT MANAGER, P.E. Title

PRESIDENT

Title

07/31/09

07/31/09

Date

07/31/09

Date

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 35th 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 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 **<u>QCD</u>** 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 **<u>QCD</u>** 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 <u>**QCD**</u> 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 <u>**QCD**</u> 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 <u>All Tendons</u>
- 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.
- 9.1.5 Required hold time at full pressure: *30 minutes*.
- 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 <u>Hoop and DomeTendons</u>
- 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.
- 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.
- 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 1/8 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 1/8 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 25-1/2" and the final grease height was 6-1/4", this is a 19-1/4" reduction multiplied by 1.77 gallons per inch which equals 34.1 gallons pumped in.

$$(25 \frac{1}{2}"-6 \frac{1}{4}") \times 1.77 = 34.1Gal$$

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.



PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 6 of 10 Revision 0

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.
- 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.
- 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 **<u>QCD</u>** Document the initial grease height dimension to the nearest 1/8 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°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 **<u>QCD</u>** Once the tendon end has been completed, document the final grease height dimension to the nearest 1/8 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 **<u>QCD</u>** 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 **<u>QCD</u>** 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 **<u>QCD</u>** 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 **<u>QCD</u>** Document the ambient temperature near the tendon, as well as the Thermometer Identification and Recalibration Date.
- 13.7 **<u>QCD</u>** 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 1/8 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 **<u>QCD</u>** Once the tendon end has been completed, document the final grease height dimension to the nearest 1/8 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 **<u>QCD</u>** Document whether grease replacement was accomplished by hand pumping or pouring.
- 13.16 **<u>QCD</u>** 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:

[TOTAL TENDON QUANTITY REPLACED (14.1)]-[TOTAL TENDON GREASE LOSS (8.9)] NET VOLUME TENDON VOID (SQ 12.2) ×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 **<u>QCD</u>** – 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 <u>QCD</u> point.

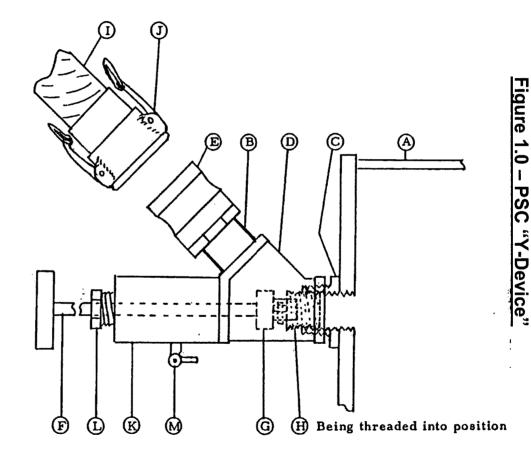
17.0 ATTACHMENTS

- 17.1 Figure 1.0 PSC "Y" Device
- 17.2 Data Sheet 12.1a Pressure Pumping
- 17.3 Data Sheet 12.1b Hand Pumping

A - Grease Can Body B - Pipe

- C Grease Can Filler Bushing
- D Y-Device Body
- E Male Quick Coupler
- F Operating Shaft & Handle
- G Square Male Pipe Plug Wrench
- H Pipe Plug
- I Casing Filler Hose
- J Female Quick Coupler
- K Packing Box
- L Packing Box Gland
- M Relief Valve Optional

PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT Figure 1.0 – PSC "Y" - Device July 31, 2009 Page 1 of 1 Revision 0



TYPICAL HOOK-UP FOR FILLING TENDON VOIDS

Topi281% Poport 2014 R8 NSh doc Attachment 8.7 Page 311 of 523

PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT Data Sheet 12.1a – Pressure Pumping July 31, 2009 Page 1 of 1 Revision 0

| R | S | 5 |
|---------|---|------------|
| Za A | X | Z O |

| Project: TMI 35 th YEAR TENDON SURVEILLANCE | Tendon No.: | |
|--|---|----|
| GREASE REPLA | CEMENT QC SIGNOFF | FS |
| (8.4) Grease Used INEW OLD - TEST DATE: 8.0 PREREQUISITES | ACCEPTABLE APPROVAL LETTER DATED: | |
| (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.: <u>°F</u> Thermometer ID: | Recal Date: | |
| (12.7) Grease Temp.: <u>°F</u> Thermometer ID: | Recal Date: | |
| (12.9) Initial Grease Height (a) in. (12 | .14) <u>Final</u> Grease Height (b) in | |
| (12.16) Total amount of Grease Pumped: ga | al. (a – b) x 1.77 into the end | |
| (12.18) Quantity of Waste Grease: ga | al. (12.17) Was Exit Achieved? 🛛 Yes 🗌 No | |
| (12.19) Total Grease <u>Replaced</u> this end: ga | al. If no, Pressure Held forpsimin | |
| <u>13.0 HAND PUMPING – SECOND END</u> (if necessary) | | |
| (13.6) Ambient Temp.: <u>°F</u> Thermometer ID: | Recal Date: | |
| (13.7) Grease Temp.: <u>°F</u> Thermometer ID: | Recal Date: | |
| (13.9) <u>Initial</u> Grease Height (a) in. (13 | .12) <u>Final</u> Grease Height (b)in | |
| (13.14) Total amount of Grease added: ga | al. (a – b) × 1.77 into the end | |
| (13.16) Quantity of Waste Grease: ga | al. (13.15) 🔲 Poured 🔄 Hand Pumped | |
| (13.17) Total Grease <u>Replaced</u> this end: ga | al | |
| 14.0 CALCULATION OF PRESSURE PUMPING | · · · · · · · · · · · · · · · · · · · | |
| (14.1) Total <u>Tendon</u> Grease Replaced: ga | ai. (12.19 + 13.17) | |
| (14.2) Net Tendon Duct Grease Volume: ga | al. Refer to SQ 12.2 – GREASE VOLUMES, for the Tendon Net Duct Volume | |
| (14.3) Percent Difference: Total Tendon Replaced (14.1) - To Net Tendon Duct Grease V | | |
| (14.4) Grease Leaks: 📋 Yes 🗌 No | | |
| (14.5) Refill Acceptable: Yes (less than 10%) No (gre | eater than 10%) | |
| If No – Custome (14.6) Comments: | er Notified NCR No.: | |
| QC Reviewed: | Level: Date: | |
| | | _ |

PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT Data Sheet 12.1b – Hand Pumping July 31, 2009 Page 1 of 1 Revision 0

| | ····· | | | | |
|--|---|-----------------------------|-------------------|-----------------------------|---------------------------------------|
| Project: TMI 35 th YEAR TENDON S | URVEILLANCE | | | Tendon No | |
| | GREASE REF | PLACEMENT | | | QC SIGNOFF: |
| (8.4) Grease Used INEW C | OLD - TEST DATE: | | TABLE |] APPROVAL LE DATED: | ITER |
| (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: | R | Recal Date: | | |
| (13.7) Grease Temp.: °F | Thermometer ID: | R | Recal Date: | | |
| (13.9) <u>Initial</u> Grease Height (a) _ | in. | (13.12) <u>Final</u> 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: | R | Recal Date: | | |
| (13.7) Grease Temp.: °F | Thermometer ID: | R | Recal Date: | | |
| (13.9) <u>Initial</u> 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 P | UMPING | | | | |
| (14.1) Total <u>Tendon</u> Grease Replaced: | | gal. (13.17 + 13.17) |) | | |
| (14.2) Net Tendon Duct Grease Volume: | | gal. Refer to SQ 12.2 - 0 | GREASE VOLUMES, | , for the Tendon Net Duct V | /olume |
| (14.3) Percent Difference: Total T | endon Replaced (14.1) Net Tendon Duct Grea | - Total Tendon Loss (8.9 | <u>')</u> × 100 = | % Di | fference |
| (14.4) Grease Leaks: 🛛 Yes | | | | | 1 1 1 1 1 |
| (14.5) Refill Acceptable: Yes (less th | | (greater than 10%) | | | |
| (14.6) Comments: | If No – Cust | omer Notified NCR No | 0.: | | |
| QC Reviewed: | | Level: | | Date: | i |
| | | | | | |



| UNIT 1 (3 | EXELON REE MILE ISLAND 35 TH YEAR) PHYSICAL LDING TENDON SURVEILLANC | E |
|--|--|------------------|
| IN-SE | RVEILLANCE CORPORATION RVICE INSPECTION CONTROL PROCEDURE | |
| | | |
| GR | EASE VOLUMES | |
| GR | QA MANAGER | 10/13/10 |
| GR Mansane Prepared by | | 10/13/10 Date |
| ABussone | QA MANAGER | |
| Prepared by | <i>QA MANAGER</i> Title | Date |
| Hourson Prepared by Mityph E. Gr | QA MANAGER Title PROJECT MANAGER, P.E. | Date 10/13/10 |



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 35th 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.



PSC PROCEDURE SQ 12.2 GREASE VOLUMES July 31, 2009 Page 3 of 3 Revision 0 Revision 1, 10/13/10

| | NET DUCT VOLUME (GALLONS) | 10% DUCT VOLUME (GALLONS) | TENDON | NET DUCT VOLUME (GALLONS) | 10% DUCT VOLUME (GALLONS) | TENDON | NET DUCT VOLUME (GALLONS) | 10% DUCT VOLUME (GALLONS) |
|-------|---------------------------------|---------------------------------|--------|---------------------------------|---------------------------------|---------------------------------------|---------------------------------|---------------------------------|
| D-121 | 118.5 | 11.85 | H13-40 | 103.5 | 10.35 | V10 | 124.8 | 12.48 |
| D-122 | 118.7 | 11.87 | H13-41 | 103.5 | 10.35 | V11 | 123.8 | 12.38 |
| D-123 | 118.8 | 11.88 | H13-42 | 103.3 | 10.32 | V12 | 124.6 | 12.46 |
| D-224 | 119.8 | 11.98 | H24-32 | 102.9 | 10.29 | V31 | 124.8 | 12.48 |
| D-225 | 119.9 | 11.99 | H24-33 | 103.2 | 10.32 | V32 | 125.2 | 12.52 |
| D-226 | 119.9 | 11.99 | H24-34 | 103.3 | 10.33 | V33 | 125.0 | 12.50 |
| D-321 | 120.3 | 12.03 | H46-49 | 103.4 | 10.34 | V89 | 124.8 | 12.48 |
| D-322 | 120.2 | 12.02 | H46-50 | 103.4 | 10.34 | V90 | 124.9 | 12.49 |
| D-323 | 120.6 | 12.06 | H46-51 | 103.6 | 10.36 | V91 | 125.0 | 12.50 |
| D-341 | 109.5 | 10.95 | H51-48 | 103.3 | 10.33 | V131 | 124.7 | 12.47 |
| D-342 | 107.8 | 10.78 | H51-49 | 103.4 | 10.34 | V132 | 124.2 | 12.42 |
| D-343 | 106.1 | 10.61 | H51-50 | 103.4 | 10.34 | V133 | 123.9 | 12.39 |
| | | | H62-25 | 103.4 | 10.34 | | | |
| | | | H62-26 | 103.2 | 10.32 | | | |
| | | | H62-27 | 103.3 | 10.33 | · · · · · · · · · · · · · · · · · · · | | - Alerin I. Sund de la la |
| | | | | | | | | |
| | | | H46-38 | 115.17 | | V117 | 129.86 | 12.99 |
| | | | H46-39 | 115.26 | | V118 | 129.61 | 12.96 |
| | | | H46-40 | 115.04 | | V119 | 129.60 | 12.96 |
| | | | H46-41 | 114.86 | | V133 | 131.00 | 13.10 |
| | | | H46-42 | 114.89 | | V134 | 131.62 | 13.16 |
| | | | | | · ··· | V135 | 132.08 | 13.21 |

2.2 Unit 1 Volume Table

 \triangle



PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

PROGRAM PURPOSE

| Luald Bussone | Q.A. MANAGER | 07/31/09 |
|---------------|-----------------------|----------|
| Prepared by | Title | Date |
| Churtine Ca | PROJECT MANAGER, P.E. | 07/31/09 |
| Approved by | Title | Date |
| Red c ht | PRESIDENT | 07/31/09 |
| Approved by 7 | Title | Date |
| | | |
| | | |



PSC PROCEDURE QA 1.0 PROGRAM PURPOSE July 31, 2009 Page 2 of 2 Revision 0

1.0 PURPOSE

1.1 This section of the Surveillance Quality Control 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.



PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

PROGRAM SCOPE

Juall Bussone Prepared by

Approved by

proved bv

PRESIDENT Title

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

Title

07/31/09

07/31/09

Date

07/31/09

Date



1.0 SCOPE

1.1 The Quality Assurance Procedures within this Section of the Surveillance Program Quality Control 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.



PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

QUALITY ORGANIZATION

repared by

antyphi E. Cor

Approved by

Approved

PROJECT MANAGER, P.E. Title

PRESIDENT

Title

Q.A. MANAGER

Title

07/31/09

07/31/09

Date

07/31/09

Date



PSC PROCEDURE QA 3.0 QUALITY ORGANIZATION July 31, 2009 Page 2 of 2 Revision 0

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 Control.
- 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 Quality Control Manual. The stop work action shall be coordinated through the PSC Manager of Quality Assurance.
- 1.4 The Quality Control 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.



PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

QUALITY CONTROL RESPONSIBILITY

repared by

1

Approved by

Approved by

PROJECT MANAGER, P.E. Title

PRESIDENT

Title

Q.A. MANAGER

Title

07/31/09

07/31/09

Date

07/31/09

Date

34 QA 4.0 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 323 of 523



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 Quality 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 or his authorized agent for all portions of the work being performed for the project.



PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

PERSONNEL QUALIFICATIONS

Q.A. MANAGER

Title

Title

repared by

Approved by

pproved by

PROJECT MANAGER, P.E. 11/06/09 Title Date PRESIDENT 11/06/09

Date

11/06/09



PSC PROCEDURE QA 4.1 PERSONNEL QUALIFICATIONS July 31, 2009 Page 2 of 3 Revision 0 Revision 1, 11/06/09

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 (formally VT-1, VT-1C or VT-3C) are to be qualified as a Level II examiner as set forth in the 2001 Edition and 2003 Addenda of the ASME Boiler and Pressure Vessel Code, Section XI, Subsection IWL as defined in PSC's written certification practice or as qualified by Exelon.
- 1.2.1 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.
- 1.2.2 All Field Quality Control Inspectors performing reviews of Quality Control Documentation for the various procedures in the PSC Surveillance Quality Control Manual shall be qualified to a minimum of Level II in accordance with the requirements of ANSI N45.2.6-1978.
- 1.2.3 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.
- 1.3 CONSTRUCTION PERSONNEL
- 1.3.1 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.
- 1.4 CONSTRUCTION SUPERVISION
- 1.4.1 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.
- 1.4.2 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.
- 1.5 AUDITORS
- 1.6 PSC Personnel performing audits of field operations shall be qualified as auditors in accordance with the requirements of ANSI N45.2.23-1978.



PSC PROCEDURE QA 4.1 PERSONNEL QUALIFICATIONS July 31, 2009 Page 3 of 3 Revision 0 Revision 1, 11/06/09

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.

3.0 ATTACHMENTS

3.1 Training Verification Letter dated 11/06/09

Precision Surveillance Corporation

3468 Watling Street Sast Chicago, IN 46312 Mail: info@psctendon.com Phone: (219) 397-5826 Fax: (219) 397-5867 http://www.psctendon.com



Attachment to PSC Procedure QA 4.1 Page 1 of 1

November 6, 2009

QUALITY REVIEW MEMO: <u>TRAINING VERIFICATION</u>

After a review of training and certification requirements for Quality Control Inspectors it is concluded that training to the 2001 Edition; 2003 Addenda of ASME Section XI, IWA-2350, "Limited Certification", and the 1995 Edition of CP-189 meets or exceeds the requirements of the 1992 Edition of the same documents.

Personnel successfully trained to the above requirements have the knowledge, insight and training to inspect post-tensioning components as described in Precision Surveillance Corporation's limited scope training procedure. This training is relevant to IWL inspections for 1992 Edition and latter Editions up to and including 2001 with 2003 Addenda.

chi

Paul C. Smith President

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

PERSONNEL TRAINING

Prepared by

Approved by

broved by

PROJECT MANAGER, P.E. Title

PRESIDENT

Title

Q.A. MANAGER

Title

07/31/09

07/31/09

Date

07/31/09

Date



PSC PROCEDURE QA 5.0 PERSONNEL TRAINING July 31, 2009 Page 2 of 2 Revision 0

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.



PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

PROCUREMENT

Terall Bussone Prepared by

Approved by

Approved by-

PROJECT MANAGER, P.E.

Q.A. MANAGER

Title

PRESIDENT Title

07/31/09

07/31/09

Date

07/31/09

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.



PSC PROCEDURE QA 7.0 FIELD CHANGE REQUEST July 31, 2009 Page 1 of 3 **Revision** 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

FIELD CHANGE REQUEST

Q.A. MANAGER

Title

Title

ual Prusaa Prepared by

ppfoved by

Approved by

| PROJECT MANAGER, P.E. | 07/31/09 |
|-----------------------|----------|
| Title | Date |
| PRESIDENT | 07/31/09 |

Date

07/31/09



1.0 FIELD CHANGE REQUEST

- 1.1 The Field Change Request 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 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 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 Quality Control 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 Manual.



- 1.3.5.1 If gross changes occur, the Surveillance Quality Control 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 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 FCR Number 1.3.7.2.1 1.3.7.2.2 **Brief Description** 1.3.7.2.3 **Date Written** 1.3.7.2.4 **Date Approved** Date of Revision (to Surveillance 1.3.7.2.5 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

| | | | | | PROCEDURE QA 7.0 GE REQUEST FORM July 31, 2009 Page 1 of 1 Revision 0 |
|--------------------------------------|---------|---|--------------------------|---------------|---|
| SPECIAL FIELD REVISION | CONTROL | FIELD CHANG | GE REQUEST NO.: FCR | | · · · · · · · · · · · · · · · · · · · |
| REQUEST BY: | <u></u> | | D/ | ATE: | |
| | | | D | ATE: | |
| PROCEDURE NUMBER: | | REV NO.: | | E | |
| AFFECTED SECTION: | | | REVISION TO MAN | UAL REQUIRED: | YES NO |
| NCR REQUIRED: | | NCR NUMBE | R: | HOLD TAG NO.: | |
| RECOMMENDED CHANGE | | | | | |
| PSC APPROVAL SIGN & DATE: | QA | QC | | ENGINEERING | |
| EXELON APPROVAL OR CO | | | | | |
| APPROVED SITE QA AUTH | ORITY: | TIT | LE: | DATE | |
| DISPOSITION PSC QC: QC INSPECTOR: | | PLIED: | HOLD T REMOV DATE: | | |
| DISTRIBUTION | 🗍 PROJE | ON ENGINEERING ECT MGR. PSC DN QC | | - | |





| Project: TMI NUCLEAR PLANT - UNIT 1 – 35 th Year | | | | | | | |
|---|-------------|---------------------------------------|------------------|--|--|--|--|
| FIELD CHANGE REQUEST INDEX LOG | | | | | | | |
| FCR# | DESCRIPTION | DATE WRITTEN | DATE APPROVED | DATE REV. | | | |
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PSC PROCEDURE QA 8.0 DOCUMENT CONTROL July 31, 2009 Page 1 of 2 Revision 0

| | UNIT 1 (35 | EXELON E MILE ISLAND O TH YEAR) PHYSICAL DING TENDON SURVEILLANC | E |
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| | IN-SER | VEILLANCE CORPORATION VICE INSPECTION ONTROL PROCEDURE | |
| | DOCU | MENT CONTROL | |
| | GeraldBussone | Q.A. MANAGER | 07/31/09 |
| | Prepared by | Title PROJECT MANAGER, P.E. Title | Date 07/31/09 Date |
| | Approved by | PRÉSIDENT Title | 07/31/09 Date |
|); | | | 39 QA 8.0 TM.09 (SI.doc |



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.



PSC PROCEDURE QA 8.1 REVISION CONTROL July 31, 2009 Page 1 of 5 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

REVISION CONTROL

Il Busso repared by

Chritich E. Con

foved bγ

Approved by

PROJECT MANAGER, P.E.

Q.A. MANAGER

Title

Title

07/31/09

Date

07/31/09

Date

PRESIDENT

Title

07/31/09

40 QA 8.1 TM.09 ISI.doc Topical Report 204 Revion 0 Attachment 8.7 Page 340 of 523



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 Criteria VI, Document Control, of the Quality Assurance Manual.

3.0 REVISION CONTROL

- 3.1 If a revision is submitted where a Quality Control Manual has been issued, only those procedures being revised shall be affected for approval status. The remainder of the Quality Control 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 PSC Quality 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. Also see Criteria II Quality Assurance Program, Section 3.4.
- 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 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 PROCEDURE QA 8.1 REVISION CONTROL SHEET

Page ____ of ___ Revision _____ Date:____

| Project: TMI NUCLEAR PLANT - UNIT 1 - 35 th Year Revision # | | | | | | | | |
|--|----|--------|--|-------------------|-------------|------------|--|------------------|
| | | | | | ITROL SHEET | | | |
| Procedure | # | Page # | Revision/ Date | Submitted Date | Procedure # | Page # | Revision/ Date | Submitte Date |
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PSC PROCEDURE QA 9.0 NONCONFORMANCES July 31, 2009 Page 1 of 5 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

NONCONFORMANCES

Q.A. MANAGER

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Approved by

for

PROJECT MANAGER, P.E.07/31/09TitleDatePRESIDENT07/31/09TitleDate

07/31/09



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 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.

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- 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



NONCONFORMING MATERIALS, PARTS OR COMPONENTS

<u>TAGS</u>

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.

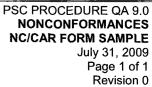
| | HOLD | | ERROR INFORMATION CARD REJECTED | 1 | ACCEPTED |
|---|------|------------|---------------------------------|----|----------|
| • | /T24 | () | INPLANATION CONCENTRATION | | ITEM |
| | | | 1 | | |
| | 3303 | | 0599 | C. | |

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 | | | | PBC X | | |
|---|---------|------------------------------------|----------|----------|--|--|
| rojaci: | Date | | Date | l ác | | |
| Tag No | issued | Description of Condition | Reniques | Sgraff | | |
| 1100 | 5-1-05 | Arkmon RIZIOI DAMAGED | 5-2-05 | CB | | |
| 1101 | 5.6-05 | DOCUMENTATIONS INCOMPLETE CTIOSE | 5-8-05 | Emn | | |
| 1102 | 6-4-05 | TENDONS ACOOL - FREED END CUTOFF | 6,10-03 | 23 | | |
| 1103 | 6-15-05 | RUSTY TENDON V135 | 6-16-05 | JWK | | |
| 1104 | 7-2-05 | Uningue to course to TENDON VILLES |] | | | |
| | | | | | | |

| QU | | SSURANCE PROGRAM JECT TAG LOG | re t | PSC | |
|----------|---------|----------------------------------|-------|-----------------|----------|
| Project: | | | | | |
| Tag No | Date | Description of Condilian | | Date Romoved | Signolit |
| 1700 | 5-2-05 | SEE HOLD TAG 1100 - SCHAP HEA | 10 | 5-4-05 | JWK |
| 1701 | 6-16-05 | SEE HOLD THE 1103 - SERAP TEN | rav | 6.32.05 | omu |
| 1702 | 6-21-05 | DRUM OF GREASE CONTAINATED - 3 | SCIA7 | 622-05 | ĊВ |
| 1103 | 6-30-05 | ANDIAC HU203 DAMAGED - SCE | qø | 6-50-05 | CB. |
| 1704 | 1-2-05 | Shows Damageo - HT # 13691.50 | 247 | 7-205 | 63 |
| | | | | | |



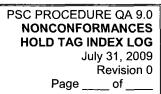
| | | PSC PROCEDL NONCONFO NC/CAR FOR Ju |
|---|--|--|
| NONCONFORMANCE/CORRECTIVE ACTION REPORT FO | RM - SAMPI | LE |
| NONCONFORMANCE / CORRECTIVE ACTION REPORT FORM | 250 | |
| HOLD TAG NO.: NC / CA NO.: | | |
| NONCONFORMANCE: Enter the nonconformance preferable referencing the quality program requirement that has be Refer to Section 2.1 of Procedure QA 9.2. AFPARENT CAUSE KNOWN: YES NO IF YES, DESCRIBE: May require consultation with QA. QE and/or Engineering. Refer to Section 2.2 of Procedure S | Log. The NC is the Project prefixed with | NCR Index R Number Number, |
| May require consolitation with the, the short Engineering. Neter to section 2.2 of Proceedines | | I |
| RECOMMENDED CORRECTIVE ACTION: The immediate corrective action that will be taken to correct the stated nonconformance. One 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. | Enter the Hol applicable. If applied, note in the Disposi | a tag was it's removal |
| CORRECTIVE ACTION TO PREVENT RECURRENCE: The long range corrective action that may be useful in eliminating the deficiency or reducing the Refer to Section 2.4 of Procedure 9.0. | completed bl | ock. |
| INITIATOR; DATE: | A "Yes" only t an evaluation | |
| SIGNIFICANT CONDITION: VES NO IF YES, REFER TO QAM SECTION 4 CRIT APPROVAL COMMENTS: | consultation v and/or Engine | · / |
| Enter any comments that might be pertinent to effecting the approval of the corrective action. Refer to Section 25. of Procedure 9.0. | To be signed indicated. Ma | |
| PSC QC APPROVAL SIGN & DATE: | signed by Inition the Dept. des | iator only if |
| OWNER / AGENT APPROVAL ENGINEER QA REQUIRED [] YES [] NO NO | notified. |] |
| COMMENTS: | | |
| This area to be input only by the Owner or his agent. Refer to Section 1.3.1.1 of Procedure 9.0 | | |
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PSC PROCEDURE QA 9.0 NONCONFORMANCES NONCONFORMANCE REPORT INDEX LOG July 31, 2009 Revision 0 Page ____ of ____



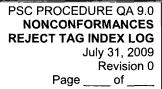
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EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

CALIBRATION OF MEASURING AND TEST EQUIPMENT

Prepared by

N

Approved by

Devorga

PRESIDENT Title

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

Title

07/31/09

07/31/09

Date

07/31/09

Date

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 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 rulers, 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 Quality 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) formerly National Bureau of Standards (NBS) and shall be controlled to an accuracy not to exceed a limit of 0.25% 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 Program Quality Control 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) Load Cell (Approx 50 Kips) | 5 Years 8 Years | + .1% Entire System + .1% Entire System |
| Rams/Jacks (Stressing, Testing, etc. | Beginning & End (B & E) of Project | Calculated to within <u>+</u> 30 kips |
| Dead Weight Tester Heise Digital Gauge | 5 Years 3 Years | + 0.10% + 0.10% |
| Pressure Gauge-Master (1/4%) Pressure Gauge-Stressing (1/4%) Pressure Gauges (1/2%) (Not used for Stressing) | B & E of Project B & E of Project 1 Year | <u>+</u> 30 psi <u>+</u> 30 psi of Heise <u>+</u> 55 psi of Heise |
| Micrometer Micrometer-Checking Bar Standard | 6 months 1 Year | + 1 DISS + 0.0001" |
| <u>Thickness (Feeler) Gauge</u> Under 0.005" 0.005" and Over (* Verified with a 0.0001" micrometer) | 6 months 6 months | <u>+</u> 0.0005"* <u>+</u> 0.0010" |
| Steel Ruler Steel Tapeline | 1 Year 1 Year | <u>+</u> 0.0100" <u>+</u> 1/16"/100' of lgth. |
| Thermometer | 1 Year | <u>+</u> 1 DISS |
| Optical Comparator | 1 Year | <u>+</u> 0.0010" |
| 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 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

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

VERIFICATION OF CALIBRATION STATUS OF HYDRAULIC PRESSURE GAUGES

Tundol Busso Prepared by

Approved by

PROJECT MANAGER, P.E. Title

PRESIDENT Title

Q.A. MANAGER

Title

07/31/09

07/31/09

Date

07/31/09

Date

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 1.5 of this Procedure, while the Verification Accuracy shall be controlled as stated in Sections 2.6 or 2.7.

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 NBS.
- 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.



PSC PROCEDURE QA 10.1 CALIBRATION VERIFICATION July 31, 2009 Page 3 of 5 Revision 0

- 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 2.6.1 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 2.6.2 or 2.7.2 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 2.6.2 or 2.7.2 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 2.6.2 and 2.7.2 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.

| | GAUGE | PSC PROCEDURE QA 10.1 CALIBRATION RECORD FORM July 31, 2009 Page of Revision 0 |
|---|-------------------------|--|
| Project: TMI NUCLEAR PLANT UNIT 1 – 35 th Year | | o#N1043 |
| GAUGE CALIBRAT | ION VERIFICATION RECORD | |
| DATE CHECKED GAUGE I.D. MASTER GAUGE I.D. REMARKS | MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
| QC SIGN OFF | | |
| Project: | | o#N1043 |
| GAUGE CALIBRAT | ION VERIFICATION RECORD | 11-2-21, 11-11-2 |
| DATE CHECKED GAUGE I.D. MASTER GAUGE I.D. REMARKS | MASTER GAUGE (PSI) | JACK GAUGE (PSI) |
| QC SIGN OFF | | |
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PSC PROCEDURE QA 11.0 Q.C. INSPECTION July 31, 2009 Page 1 of 3 Revision 0

EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

QUALITY CONTROL INSPECTION

Q.A. MANAGER 07/31/09 Title Prepared by Date PROJECT MANAGER, P.E. 07/31/09 Title Approved by Date PRESIDENT 07/31/09 Title Date oproved by



PSC PROCEDURE QA 11.0 Q.C. INSPECTION July 31, 2009 Page 2 of 3 Revision 0

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 Quality Control 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.

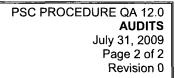


EXELON THREE MILE ISLAND UNIT 1 (35TH YEAR) PHYSICAL CONTAINMENT BUILDING TENDON SURVEILLANCE

PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE

AUDITS

| - Genald Bessione | Q.A. MANAGER | 07/31/09 |
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| Prepared by | Title | Date |
| Chuster E. Cox | PROJECT MANAGER, P.E. | 07/31/09 |
| Approved by | Title | Date |
| les a t | PRESIDENT | 07/31/09 |
| Approved by | Title | Date |
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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 a Exelon audit shall be addressed by Precision Surveillance Corporation on a timely basis with corrective action as approved by Exelon.

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| 31 | 21 | 70 | 21 | | | | |
| 32 | 21 | 72 | 21 | | | | |
| 33 | 21 | 73 | 21 | | | | |
| 34 | 21 | 74 | 21 | | | | |
| 35 | 21 | 75 | 21 | | | | |
| 36 | 21 | 76 | 21 | | | | |
| 37 | 21 | 77 | 21 | | | | |
| 38 | 21 | 78 | 21 | | | | • |
| 39 | 21 | 79 | 21 | | | | |
| 40 | 21 | 80 | 21 | | | | |

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RB Structural Integrity Tendon Surveillance

1.0 **PURPOSE**

- 1.1 To provide instructions and acceptance criteria for RB tendon inspections as required by TMI-1 Technical Specification, Section 4.4.2. (CM-1, CM-2)
- 1.2 To provide instructions and acceptance criteria for RB concrete inspections as required by TMI-1 Technical Specification, Section 4.4.2.
- 1.3 Tendon surveillance is performed at intervals after initial containment Structural Integrity Test (SIT), as follows:
 - a. One (1) year after SIT. Completed 1975.
 - b. Three (3) years after SIT. Completed 1977.
 - c. Five (5) years after SIT. Completed 1980.
 - d. At successive 5-year intervals for remaining station life.

NOTE

21 tendons were inspected at each of first three surveillance periods; see Table 1 of Enclosure 2. Prior to Cycle 7, and for subsequent periods, 12 tendons were selected in order to comply with Table IWL-2521-1. Enclosure 2, Tables 1 and 2, and Enclosure 9, Tables 1 and 2, provides identification of tendons for each inspection period. Tendon selection is random and meets the requirements of NRC R.G. 1.35 Rev. 3 and IWL 2520. In the event that a randomly selected tendon becomes inaccessible, it shall become exempt. Exempt tendons shall be inspected per IWL-2524 and IWL-2525. Substitute tendons shall be selected per IWL-2521.1(b).

1.4 A special one-time event-related tendon surveillance is performed within one year (plus/minus 3 months per ASME Code Section XI, 2004 Edition Table IWL-2521-2 requirements) following the completion of the Reactor Building Containment Opening post-tensioning tendon system repair/replacement activities of ECR 06-00816 in support of the steam generator replacements scheduled in T1R18 2009 refueling outage (SGRP Containment Opening). This special surveillance, which is limited in scope as defined in Section 8.9, satisfies an NRC recommendation from the NRC SER of Tech. Spec. Amendment #259 approving deferral of the ILRT Performance until 2009. This surveillance also maintains compliance with ASME code section XI, 1992 edition with 1992 addenda.

2.0 **REFERENCES**

- 2.1 TMI Unit 1 Technical Specifications Section 4.4.2, "Structural Integrity"
- 2.2 SA-AA-0301, Exelon Nuclear Industrial Safety Pocket Guide
- 2.3 NO-AA-10, Quality Assurance Topical Report
- 2.4 RP-AA-403, Administration of the Radiation Work Permit Program

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| 2.5 | 1001. | J.1, Surveilla | nce Testing Program | |
| 2.6 | OP-A | A-201-009, C | Control of Transient Combustible Material | |
| 2.7 | MA-A | A-716-100, N | Aaintenance Alterations Process | |
| 2.8 | MA-A | A-716-025, S | Scaffold Installation Modification and Removal Reques | st Process |
| 2.9 | Inryco | o, Reactor Bu | ilding Tendons, VM-TM-2485 | |
| 2.10 | | 5-10 and Sur re; date Febr | pplement 1 to same, entitled Post Tensioned Contain uary 6, 1985 | ment Tendon Anchorhead |
| 2.11 | SP-1 | 101-23-007, | _atest Revision, RB Tendon Surveillance Specificatio | n |
| 2.12 | | TMI-1 Operating manuals and calibration charts for hydraulic stressing jack, pumps, and controls (supplied by vendor). | | |
| 2.13 | | Building Pre-Stressing System Tendon History, including Tendon Pulling, Buttonheading, and Stressing Records (cards). | | |
| 2.14 | Repo | Reports from previous surveillance | | |
| | 0 | 1974 Stru | ctural Integrity Test - GAI Report 1838 | |
| | 0 | 1975 Ten | don Surveillance - 1301-9.1 - GAI Report 1880 | |
| | 8 | 1977 Tend | don Surveillance - 1301-9.1 - Report GQL 0204 | |
| | 0 | 1980 Teno | don Surveillance - 1301-9.1 - TDR 229 | |
| | 0 | 1985 Teno | don Surveillance - 1301-9.1 - Topical Report 025 | |
| | 6 | 1990 Teno | don Surveillance - 1301-9.1 - Topical Report 069 | |
| | 0 | 1995 Teno | don Surveillance - 1301-9.1 & Topical Report 093 | |
| | 8 | 1999 Teno | don Surveillance - 1301-9.1 and Topical Report 136 | |
| | Ø | 2004 Ten | don Surveillance – 1301-9.1 and Topical Report 183 | |
| | | 2009 Teno | don Surveillance – 1301-9.1 and Topical Report 203 | |
| | 0 | 1977 RB | Ring Girder Surveillance Three Years After S.I.T 13 | 03-8.2 |
| 2.15 | 1410- | -Y-83, RB Te | ndon End Cap Installation | |
| 2.16 | 1440- | -Y-23, RB Co | ncrete Surface Crack Repairs | |
| 2.17 | GAI DC-5390-225.01-SE and GAI DC-5390-225.02-SE, TMI-1 Reactor Building Post-Tensioning System Tendon Selection and Force vs. Time Curves Surveillances 6 through 10. | | | |

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| 2.1 | | atory Guide inments. | 1.35, Rev. 3, Inservice Inspection of Ungrouted Te | andons in Prestressed Concrete |
| 2.1 | 9 G/C C | Calculation 1: | 01:01.01, "Structural Design Review Book 1" (Sou | urce Document) |
| 2.2 | 0 MA-A | A-716-021, F | Rigging and Lifting Program | |
| 2.2 | 1 AD-A | A-2001, Man | agement and Oversight of Supplemental Workford | ce in the second second second second second second second second second second second second second second se |
| 2.2 | 2 10CF | R 50.55a, Co | odes and Standards | |
| 2.2 | 3 EN-M | A-501, Contr | olled Materials and Hazard Communication Progr | am |
| 2.2 | 4 ASME | E XI 1992 Ed | ition through 1992 Addenda, Subsection IWL | |
| 2.2 | 25 ACI 2 | 01.1R-92, "G | uide for Making a Condition Survey of Concrete I | n Service" |
| 2.2 | 26 ACI 3 | ACI 349.3R-96, "Evaluation of Existing Nuclear Safety Related Concrete Structures" | | |
| 2.2 | | TMI-1 C-1101-153-E410-031, 032, and 033, Tendon Grease Void Calculations for Vertical, Horizontal, and Dome Tendons, respectively | | |
| 2.2 | | TMI-1 Relief request Nos. RR-1 thru RR-7, Implementation of Subsections IWE and IWL, Letter No. 5928-00-30179, Dated 4/27/00 | | |
| 2.2 | | Reactor Building Drawings TMI 1-0014/0015/0016, IWE Component Rollout-Outside Containment Concrete | | |
| 2.3 | | ER-AA-330-006, Inservice Inspection and Testing of the Pre-stressed Concrete Containment Post Tensioning System | | |
| 2.3 | 1 ER-A | A-330-005, ∨ | isual Examination of Section XI Class CC Concre | te Containment Structures |
| 2.3 | | ER-AA-335-018, Detailed General VT-1 VT-1C VT-3 and VT-3C Visual Examination of ASME Cla MC and CC Containment Surfaces and Components | | ual Examination of ASME Class |
| 2.3 | 3 ASME | E XI 2004 Ed | ition (No Addenda) | |
| 2.3 | 84 TMLU | JFSAR, curre | ent revision, Chapter 5 | |
| 2.3 | 5 ECR | 06-00816 | | |
| 2.3 | 86 1997 | Universal Bu | ilding Code (UBC 97) | |
| 2.3 | 37 <u>Comr</u> | <u>nitments</u> | | |
| | СМ-1 | | cking Item AR 603573.25.06, License Renewal A , Subsection IWL. (Step 1.1) | ging Management ASME |
| | CM-2 | Action Tra | cking Item AR 603573.38.04, License Renewal A | ging Management Concrete |

CM-2 Action Tracking Item AR 603573.38.04, License Renewal Aging Management Concrete Containment Tendon Prestress. (Step 1.1)

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3.0 PLANT STATUS

3.1 Operating or Shutdown.

NOTE RB entry not necessary for tendon or concrete inspection.

3.2 For safety reasons, during plant operation no tendons with end caps located above steam safety valves are to be scheduled for surveillance.

4.0 **PREREQUISITES**

- 4.1 TENDON SURVEILLANCE CONTRACTOR (CONTRACTOR) shall perform tendon surveillance in accordance with this procedure.
 - 4.1.1 CONTRACTOR shall have a quality assurance program in place which meets requirements of 10 CFR 50, Appendix B. This program and associated QA/ISI procedures shall have been submitted to TMI for review/approval prior to commencement of work.
 - 4.1.2 CONTRACTOR shall be on TMI Evaluated Vendors List (EVL).
- 4.2 CONTRACTOR shall ensure TESTING LABORATORY equipped to perform following services shall be available for this surveillance:
 - 4.2.1 Inspection of removed wires for corrosion and other defects, and to perform required tensile tests. (See Enclosure 4.)
 - 4.2.2 Inspection of bulk filler grease samples and test for chlorides, sulfides, nitrates, base number and moisture content. (See Enclosure 3.)
 - 4.2.3 Calibration (traceable to NIST) of all hydraulic rams and gauges to be used.
 - 4.2.3.1 Stressing ram shall be calibrated per Enclosure 1 or CONTRACTOR may propose an alternative method. **IF** alternative used, CONTRACTOR should submit method for TMI-1 approval at least 30 days prior to start of tendon surveillance and procedure must then be included in CONTRACTOR report.
 - 4.2.3.2 Calibrate equipment used to measure tendon force within 3 months prior to the first tendon force measurement and within 3 months following the final tendon force measurement of the inspection period (IWL-2522(b)).
 - 4.2.3.3 CONTRACTOR'S QA program shall be imposed on Testing Laboratory.
- 4.3 CONTRACTOR shall ensure all necessary inspection, detensioning/retensioning/greasing equipment is obtained and calibrated as specified herein.
 - 4.3.1 CONTRACTOR shall ensure detailed operating instructions and calibration documentation are supplied with rams.

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- 4.3.2 CONTRACTOR should submit calibration records to OWNER at least 15 days prior to start of tendon surveillance work and again within 15 days after demobilization from TMI-1. In no case shall work be allowed to start without TMI approval of calibration records.
- 4.4 CONTRACTOR shall field verify proposed stressing rams are of proper configuration for TMI-1 dome tendons.
- 4.5 CONTRACTOR must perform and document training of supervisory personnel with respect to this procedure prior to starting work.
- 4.6 CONTRACTOR shall verify communication equipment (i.e., headsets, walkie talkies) for use in communication between work crews is operable.
- 4.7 CONTRACTOR QC/QV personnel should report to Site Nuclear Oversight and to NDE Manager.
- 4.8 **IF** lifting and handling equipment is to be used, CONTRACTOR shall ensure rigging and lifting devices have been inspected/approved for use per Reference 2.20.
- 4.9 OWNER shall verify calibration documentation is acceptable for calibrated inspection and stressing equipment.
- 4.10 COGNIZANT WORK COORDINATOR (per Reference 2.21) or designated alternate shall notify on-shift TMI-1 Shift Management of work scope to be performed by CONTRACTOR at beginning of each work day of Tendon Surveillance or related activities.
- 4.11 **IF** working on or in radiologically controlled area, initiate RWP, per Reference 2.4.
- 4.12 Install required scaffolding per Reference 2.8.
- 4.13 Work Coordinator shall ensure ANII is notified prior to start of work.
- 4.14 Work Coordinator shall ensure required indoctrination and training of CONTRACTOR per Reference 2.21 is conducted prior to start of work.
- 4.15 CONTRACTOR Examiner shall use a visual VT-1/VT-3/VT-1C/VT-3C examination procedure(s) qualified to meet the distance and illumination requirements contained in the Code (Ref. 2.32), or in any TMI relief requests from the Code requirements. TMI and the ANII shall approve the qualification of the procedure.
- 4.16 COGNIZANT WORK COORDINATOR verify that Exelon has assigned a Responsible Engineer who meets the requirements identified in the 1992 Edition (with 1992 Addenda) of the ASME Boiler and Pressure Vessel Code, Section XI, Par. IWL-2320 and 2004 edition with no addenda.
- 4.17 COGNIZANT WORK COORDINATOR verify that the experience and training of Contractor personnel performing visual examinations satisfy the requirements established by the Responsible Engineer. Verify that these individuals are identified on Data Sheet 12 and that the appropriate approvals are obtained.
- 4.18 Document review and acceptance of applicable contractor procedures on Data Sheet 13.

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5.0 LIMITS AND PRECAUTIONS

- 5.1 Conduct this procedure in accordance with Reference 2.5 and 2.7.
 - 5.1.1 **IF** AS FOUND conditions do not meet acceptance criteria, notify COGNIZANT MECHANICAL/STRUCTURAL ENGINEER as soon as practical and initiate Surveillance Deficiency Report (SDR) per Reference 2.5.
- 5.2 Ensure all work is performed in accordance with Exelon Nuclear Industrial Safety Pocket Guide.
 - 5.2.1 CONTRACTOR shall report IMMEDIATELY to COGNIZANT WORK COORDINATOR, any working condition which appears to be unsafe.
- 5.3 Some work may be near plant equipment required for safe shutdown or which may CAUSE shutdown if damaged. Use special care when suspending or moving stressing rams (jacks) or other heavy surveillance equipment.
 - 5.3.1 TMI WORK COORDINATOR should work with CONTRACTOR FOREMAN to predict such hazards, and shall keep Operations Shift Management informed when working in such vital areas.
 - 5.3.2 Discuss all lifting arrangements inside plant buildings with COGNIZANT WORK COORDINATOR and obtain approval to ensure no damage to plant equipment.
 - 5.3.3 Discuss routes for transporting heavy equipment through plant buildings with COGNIZANT WORK COORDINATOR and obtain approval.
- 5.4 Protect all roof surfaces from grease, oil, and debris, as spillage will result in roof degradation. Use drop cloths or similar covering to prevent roof damage.
- 5.5 Protect all built-up roof surfaces when erecting scaffolding, moving or storing heavy equipment, tool boxes, etc., by installing planking on roof surface.
- 5.6 Minimize transient combustibles per Reference 2.6. Clearly label all receptacles containing combustibles such as grease, solvent, used rags, etc.
- 5.7 All chemicals utilized shall be controlled and evaluated per Reference 2.23.

6.0 DESCRIPTION AND LOCATION OF SYSTEM/ASSEMBLY

- 6.1 RB tendons located within concrete shell of Reactor Building. Access to tendons is from outside of RB.
- 6.2 Layout of tendon system, location and identification can be found in VM-TM-2485. (Ref. 2.9)

| NOTE | | | |
|--|--|--|--|
| | | | |
| Testing of tendons around Main Steam Safety Valve exhaust area shall not be scheduled during plant operation due to personnel safety | | | |
| concerns. (Refer to Enclosure 8 Guidelines.) | | | |

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7.0 SPECIAL TOOLS, MATERIALS AND PERSONNEL QUALIFICATIONS

7.1 General

Title

| Г | NOTE | | | | |
|-------|---|--|--|--|--|
| | CONTRACTOR must document any substitution of materials along with TMI-1 COGNIZANT MECHANICAL/STRUCTURAL ENGINEER approval. | | | | |
| 7.1.1 | 7.1.1 (2) - powered staging platforms consisting of roof trolley and working platform with hoisting equipment for jack handling. Platforms will provide access to tendon ends inspected and will support jacks during lift off measurement at each end. | | | | |
| | | 7.1.1.1 | As temporary structures, these exterior platforms do not have specific design criteria for seismic and wind loading. 90 mph wind loading and seismic loading from UBC 97 shall be used in the design of these platforms. | | |
| 7.1.2 | 2 | Permanen | t 460 volt electrical outlets on top surface of ring girder for miscellaneous uses. | | |
| 7.1.3 | 3 | 115 volt outlets on working platform to power hydraulic stressing jack, pumps, and other electrically-powered equipment. | | | |
| 7.1.4 | ļ | Electrical cables or heavy duty extension cords as necessary for lights, hydraulic stressing jack pumps, and other miscellaneous power tools. | | | |
| 7.1.5 | 5 | Lift for two (2) men and hand tools. | | | |
| 7.1.6 | 6 | Portable work platforms for use inside buildings. | | | |
| 7.1.7 | , | Communications equipment for work crew communications. | | | |
| 7.1.8 | 3 | Miscellaneous hand tools. | | | |
| 7.1.9 |) | Solvent - for removing grease from around tendon anchorage and cleaning any stained concrete (CRC Natural Degreaser Aerosol <u>or</u> EPA 2000). Viscosity/Oil Industrial Solvent #16 may only be used if MSDS has been specifically approved for TMI use. | | | |
| 7.1.1 | 10 | Cleaning rags - approximately 3 bales. | | | |
| 7.1.1 | 1 | Ambient temperature monitoring equipment. | | | |

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7.2 Detensioning/Retensioning Equipment

- 7.2.1 (2) tendon stressing rams (jacks) with 1600 KIPS or greater capacity.
 - Rams body configuration must not conflict with ring girder cut-outs and must have a stroke of at least 6 inches unless clearance and/or weight restrictions require the use of a ram with a shorter stroke.
 - Ram heads (stressing ram adapters) must mate with Inland Ryerson 170 wire threaded anchor head.
 - Ram must have a longer than standard chair piece to fit TMI dome tendons.
 - Ram chair shall have access openings at 180° to permit installation and removal of feeler gauges at about 180° apart under the stressing washer to obtain lift-off readings.

NOTE

Considerable critical path time was spent by CONTRACTOR during inspection number 2 and 3 to modify Ft. St. Vrain rams.

To avoid personnel or equipment hazards, all equipment provided must be in good condition and designed as suitable for the purpose.

- 7.2.2 Pumps, hoses, pressure gauges, controls, hydraulic fluid, etc. as required for use of stressing ram.
- 7.2.3 Files for dressing threads on damaged anchorage heads.
- 7.2.4 Shims 170 wire split type of various thicknesses, such as 1/8", 1/4", 1/2", 3/4", and 1", (5) sets or more of each thickness, as required (Inland-Ryerson part No. 101006-8, 101006-5, 6, 7, and 1 respectively).
 - Specifications for replacement shims shall require certificate of compliance to ASTM A36 with S2 requirements (material to be silicon-killed fine grain practice) and certified mill test reports showing chemical and physical test results.
- 7.2.5 Wooden or plastic paddles or spatulas to scoop out bulk filler grease from around anchorage assembly.

7.3 Inspection Equipment

NOTE

Calibration Documentation required for all measuring equipment in this section.

7.3.1 Feeler gages for crack measurements. Required range of blade sizes is 0.005" to 0.010" by 0.001" increments.

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- 7.3.2 Feeler gages for lift-off tests. Gage thickness is 0.030" and width 1/2".
- 7.3.3 Optical comparators with 0.001" accuracy for measuring crack widths in concrete or buttonheads.
- 7.3.4 Grid paper for showing concrete crack patterns at vertical and hoop tendons.
- 7.3.5 Magnifying glass, 5x (minimum)

Title

- 7.3.6 Wire cutters to cut 1/4 inch diameter, high strength (240,000 PSI) tendon wires.
- 7.3.7 Extraction tool suitable for removing wires subject to tensile tests.
- 7.3.8 Come-along hoist, or similar device, for extracting test wires.
- 7.3.9 Six-foot diameter wire coiler to coil removed wire.
- 7.3.10 GO/NO-GO thread plug gages for anchorage thread measurement.
- 7.3.11 Inside and outside micrometers for anchorage thread measurements.
- 7.3.12 Visual inspection equipment to perform VT-3C and VT-1C exams.

7.4 Equipment for Greasing and End Cap Replacement

- 7.4.1 Grease pump, transmission lines, various fittings mounted on storage tank equipped with heating system to heat grease to between 140°F and 200°F.
 - Grease pump must be fitted with discharge relief valve set for maximum of 300 PSIG.
- 7.4.2 (5) 55-gallon drums of bulk filler grease, Visconorust 2090P4, by Viscosity Oil Co., or EQUAL as approved by the COGNIZANT MECHANICAL/STRUCTURAL ENGINEER.

| | | NOTE |
|-------|---|--|
| | Grease qu | antity is estimate only. More or less may be required. |
| | 0 | Certified test report for grease is required indicating water soluble chloride, sulfide, nitrate, reserve alkalinity and moisture content. |
| | 0 | Tests and acceptance limits shall be per Enclosure 3. |
| 7.4.3 | (Approx. 6) - 55-gallon capacity drums for holding waste grease. Should be steam cleaned and air dried until no moisture or dirt is observed. | |
| | 0 | To be clearly labeled on top and side: "WASTE TENDON GREASE ONLY" |
| 7.4.4 | (Approxim | ately 10) - 5-gallon capacity cans with bails. |

7.4.5 End Cap Consumables and Hardware per 1410-Y-83.

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8.0 **PROCEDURE**

Title

NOTE

The CONTRACTOR may use its own procedures to perform any or all steps of this surveillance. The CONTRACTOR's procedures shall be reviewed and approved by the TMI COGNIZANT MECHANICAL/STRUCTURAL ENGINEER. Data Sheet 13 shall document the review and acceptance of CONTRACTOR's procedures.

8.1 Equipment Setup

- 8.1.1 Verify all applicable equipment listed in Section 7.0 available.
- 8.1.2 Verify Operating manuals and calibration charts for hydraulic stressing jack, pumps, and controls available for use.
 - Verify all personnel familiar with operating manuals of equipment to be used during inspection.
- 8.1.3 Verify stressing jacks, pressure gages, optical comparators, and all other measuring devices have been calibrated and are in good working condition.
 - Ensure calibration documentation signed, dated, and traceable to NIST.
 - Verify stressing jack-pressure gauge system is capable of measuring tendon force within an accuracy of ± 1.5% of the specified minimum ultimate strength of the tendon (± 30 kips or better). Refer to Enclosure 1 for additional calibration details.
 - During inspection, check pressure gauge calibration daily against a master pressure gauge used only for this purpose. CONTRACTOR shall document this check.
- 8.1.4 Verify TESTING LABORATORY prepared to receive wire and grease samples.
- 8.1.5 Complete Data Sheets 1 and 2 for each tendon selected for inspection with:
 - tendon number,
 - tendon end (shop/field),
 - expected lift-off (predicted) force, and
 - oprevious shim thickness.

NOTE

Value for Predicted/Expected Lift-Off force is Base Value force obtained from applicable Force versus Time curve contained in DC-5390-225.01-SE or C-1101-153-E410-046 (for SGRP affected tendons).

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8.1.6 Complete Rows 1 through 6, 8, 9, 10 and 12 of Data Sheet 4 for tendons to be detensioned.

NOTE

Values to be entered in Rows 1 through 4 of Data Sheet 4 are given in Table 7 of VM-TM-2485.

- 8.1.7 Enter Normalization Factor (NF) obtained from applicable force versus time curve contained in DC-5390-225.01-SE or C-1101-153-E410-046 (for SGRP affected tendons), on Data Sheet 5 for selected tendons.
- 8.1.8 Enter predicted force, 0.95 predicted force, and 0.90 predicted force (as documented in DC-5390-225.01-SE or supplementary calculation) for all sample tendons on Data Sheet 2.
- 8.1.9 **IF** working in areas exposed to steam vents, verify plant is shut down. (Refer to Enclosure 8 area guidelines).
- 8.2 Hoop and Dome Tendon Inspection

NOTE

Once inspection of a given tendon has started, it should be completed as soon as possible to avoid unnecessary exposure of anchorage head.

- 8.2.1 Protect roof surface as required prior to starting inspection.
- 8.2.2 Place platforms in position at ends of tendon to be inspected.
- 8.2.3 **IF** tendon inspection is not completed during a work shift, protect anchorage area and grease cans from exposure to moisture, dirt and any other potentially damaging materials.
- 8.2.4 Tendons shall be regreased (filled) within 30 days maximum after removal of an end cap. During the 2009 surveillance, extension of the 30 day maximum may be granted by the Responsible Engineer, as documented in this surveillance package.
- 8.2.5 Corrosion Protection System
 - a. Depressurize and remove end caps per 1410-Y-83 and PSC ISI Manual Procedure SQ6.1.
 - b. Inspect for presence of free water in end cap and at anchorage area per this procedure and PSC ISI Manual Procedure SQ6.1.
 - c. Enter inspection results on Data Sheet 9.

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CAUTION

When removing grease to make visual inspection, use plastic or wood scrapers to avoid scratching/damage to end anchorage components and resultant corrosion.

NOTE

Free water shall not be included in the grease sample (IWL-2525.1[a]).

- d. Take a representative one liter grease sample from each end anchorage of selected tendons.
- e. When present, free water sample shall be taken where water is present in quantities sufficient for lab analysis. Record quantity of free water and request lab analysis for PH (IWL-2525.2[b]),
- f. Have grease sample tested per Enclosure 3.
- g. Verify sample meets acceptance criteria specified in Enclosure 3.
- h. Remove and collect remaining bulk filler from tendon anchorage area using wooden or plastic scoops and cleanup using solvent and rags. Collect in clean drums or other containers.
- i. Record the total amount of bulk filler grease removed up until reinstallation of the end cap per the guidelines of 1410-Y-83. Document on Data Sheet 11.
- 8.2.6 Inspect Anchorage prior to Lift-Off test.
 - a. Perform VT-1 inspection of tendon anchorage assemblies and associated hardware (bearing plates, stressing washers, stressing shims, buttonheads, and exposed wires) for signs of corrosion, cracks, missing wires, and broken wires. If broken or damaged wires are detected, the tendon shall be detensioned and the wire removed for testing as specified in Section 8.2.9.
 - b. Perform VT-1C inspection of the concrete around tendon anchorage area, and for a distance of 2 feet extending outward from the bearing plate for crack width and general cracking pattern and for indications of abnormal material behavior.
 - c. Complete data sheets in Enclosure 6.
 - d. **IF** crack widths in concrete > 0.010" are identified, record and report immediately to COGNIZANT MECHANICAL/STRUCTURAL ENGINEER for evaluation and resolution.

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| | | NOTE | |
|-------|--------------------|---|--|
| | ack widths .72. | in concrete > 0.010" are potentially reportable per 10 CFR | |
| | e. | IF crack widths > 0.05" are identified, record and report immediately to COGNIZANT MECHANICAL/STRUCTURAL ENGINEER for IMMEDIATE evaluation and investigation to determine amount of structural impairment upon containment structure and its continued integrity. | |
| | f. | IF any condition not meeting acceptance criteria in Enclosure 6 is noted, document using sketches, photographs, etc. as applicable and report immediately to Cognizant Mechanical/Structural Engineer. | |
| | g. | CONTRACTOR shall ensure TMI-1 has evaluated any out-of-specification condition prior to making condition inaccessible. A written evaluation will be provided to CONTRACTOR for his report. | |
| | h. | Cracks ≥ 0.050" must be repaired after TMI-1 Engineering does an evaluation. Repair will be per 1440-Y-23, "RB Concrete Surface Crack Repairs". | |
| 8.2.7 | Lift-Off Test | | |
| | a. | Verify that anchor head treads are acceptable per TMI approved vendor procedure. Completion of Data Sheet 8 is at the option of the Responsible Engineer. | |
| | b. | IF an UN-ACCEPTABLE anchor head thread condition exists, immediately notify COGNIZANT MECHANICAL/STRUCTURAL ENGINEER. | |
| | С. | Record calibration constants, ram area, ram identification number (I.D.) on Data Sheet 1. | |
| | d. | Measure and record thickness of shim stack on Data Sheet 1. | |
| | e. | Lubricate anchorage washer threads with a small amount of bulk filler grease as required. | |
| | f. | Thread ram onto anchorage stressing washer and bearing plate per ram operating instructions. | |
| | g. | Ensure <u>full</u> thread engagement of the coupler to the stressing washer. | |
| | h. | Visually examine jack prior to each use for damage or deformation. | |

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WARNING

Jack is being operated up to 1,600 KIPS of force. Exercise extreme caution and strict adherence to all safety regulations as contained in operating manual. DO NOT stand behind hydraulic jack while stressing a tendon. Exercise extreme caution if fingers or hands are required near tendon anchorage head during testing.

CAUTION

DO NOT exceed 80% of ultimate tensile stress (equivalent to a jack force of 1592 KIPS (for a tendon with 169 effective wires) when performing lift-off test.

- i. **IF** lift-off is not achieved at jack force of 1592 KIPS, **STOP**, unload jack and immediately notify COGNIZANT MECHANICAL/STRUCTURAL ENGINEER.
- j. Observe the position of the anchorhead prior to applying pressure. Count the anchorhead revolutions about the tendon axis, if any, during lift-off. Record the number of revolutions on Data Sheet 1.
- Begin applying pressure to jack, and continue applying pressure until stressing washer (anchorhead) lifts off shim pack just enough to insert (2) 0.030" thick feeler gages, located approximately 180 degrees apart, between anchor head and shim pack or shim pack and bearing plate.
- I. Reduce jack pressure to achieve corresponding force reduction of approximately 100 KIPS. Obtain relationship between jack pressure and force from Calibration Equation recorded on Data Sheet 1.
- m. Slowly increase jack pressure until both feeler gages becomes loose enough to move. When this occurs, STOP increasing jack pressure and record jack pressure reading and corresponding force on Data Sheet 1.
- n. Complete Consecutive Three Trial Pressure Spread and Average on Data Sheet 1.
- o. Repeat lift-off measurement tests until 3 consecutive force measurements are all within 25 KIPS as recorded on Data Sheet 1.

NOTE

When tests are all within 25 KIPS of each other, official lift-off force for tendon end is the mean of the 3 consecutive force measurements, which is obtained from Data Sheet 1.

- p. CONTRACTOR shall record information on Data Sheet 1.
- q. Record gage pressure corresponding to official lift-off force on Data Sheet 1.
- r. Record official lift-off force on Data Sheet 1.

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s. Remove feeler gages and slowly decrease pressure on jack to allow stressing washer to reseat onto shims. No additional shims are to be added at this time.

| | NÔTE |
|-------------------|---|
| DO NOT d ends. | etension either end until lift-off has been recorded for both |
| t. | Repeat lift-off test at other end of tendon. |

- u. Calculate average value of forces required to achieve lift-off of tendon, and enter on Data Sheet 2.
- v. Verify force meets Acceptance Criteria specified in Step 9.3.
- w. During lift-off testing, record reactor building internal temperature and the temperature of the concrete adjacent to the tendon anchorage on Data Sheet 1.

NOTE

Use value recorded from RTD TE 655I, TE 655U or TE 655P in Control Room for RB internal temperature.

- x. Enter As-Found average lift-off force from Data Sheet 2 in Column (1) of Data Sheet 5.
- y. After lift-off tests are completed for all selected tendons in a group, e.g., all dome tendons, complete Data Sheet 5. Fill out Data Sheet 6 after all re-tensioned tendon lift-off tests are complete.
- z. Verify average of all normalized lift-off forces in a group meets Acceptance Criteria of Step 9.3.
- aa. The COGNIZANT MECHANICAL/STRUCTURAL ENGINEER shall review the results and trends of the measured prestress forces from consecutive surveillances for the control tendons and tendons as a group. Perform a statistical analysis of time dependent lift-off force trends and verify that the criteria of Step 9.3 are satisfied. Plot lift-off for control tendons on force vs. time curves.

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| 8.2.8 Dete | ension Tendon | |
| | | |

- 1. **DO NOT** exceed 70% of ultimate tensile stress (equivalent to a jack force of 1393 KIPS (for a tendon with 169 effective wires) (IWL-2523.3).
- 2. During plant operation, detension ONLY ONE tendon at a time. During the T1R18 steam generator replacement in 2009, special limits on the number of tendons detensioned during power operation had been applied, consistent with the 50.59 evaluation limitations of SE-000153-021.

NOTE

- 1. To prevent holding jacks under pressure for periods of time, it is recommended that both ends of tendon be detensioned simultaneously.
- 2. Shims are paired and must be stacked in pairs.
 - a. Increase pressure to jacks until shims can be removed.
 - b. Remove split shims from shim stacks.
 - c. Slowly decrease pressure (rate < 2000 PSIG/MIN) on jacks to completely detension tendon.

NOTE

DO NOT uncouple jacks until tendon is completely detensioned.

- d. Uncouple jack, while minimizing twisting of tendon to 1/2 of a revolution.
- e. Record on Data Sheet 1 the number of revolutions of the anchorhead (if any) during uncoupling.
- 8.2.9 Remove Wire and Test
 - a. Perform VT-1 inspection of the detensioned tendon anchorage assembly for missing, broken, and/or damaged wires protruding from the anchorhead.
 - b. Record results on Data Sheets 1 and 2 in Enclosure 6 specifically noting any results observed after detensioning.
 - c. Remove a randomly selected wire that had been stressed prior to detensioning from each selected detensioned tendon listed in Enclosure 2, Table 2 and/or Enclosure 9, Table 2.

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- d. Also remove all broken or damaged wires (if any). Remove enough of each broken or damaged wire to allow tensile testing and visual examination to evaluate the cause of breakage or damage.
- e. Follow procedure in Enclosure 4 and PSC ISI Manual Procedure SQ10.3 for testing and examining all removed wires and completing Data Sheets.

8.2.10 Retension Tendon

CAUTION

DO NOT exceed 80% of ultimate tensile stress (equivalent to a jack force of 1593 KIPS (for a tendon with 169 effective wires).

- a. Retension both ends of a tendon approximately simultaneously, such that force difference between ends does not exceed 250 KIPS at any time during retensioning.
- b. Prior to starting retensioning, enter header information for tendon to be retensioned on Data Sheet 1, and calculate P'_{max} and P'_{min} and enter on Data Sheet 1. Complete Columns 2 through 5 on Data Sheet 6 by recording the following information.
 - (1) Number of effective wires.
 - (2) 70% of tendon ultimate strength (8.24 kip x Number of Effective Wires).
 - (3) Predicted Base Force from DC-5390-225.01-SE or separate calculation.
 - (4) Target lock-off force; [70% of ultimate strength + Predicted Base Force]÷2.
- c. Verify Rows 1, 2, 6 through 9 and 12 of Data Sheet 4 have been completed.
- d. At each tendon end, stress tendon to gauge pressure recorded in Row 2 on Data Sheet 4. Record actual pressure in Row 3.
- e. Record ram extension in Row 5 of Data Sheet 4.
- f. Stress tendon to gauge pressure recorded in Row 9 of Data Sheet 4. Record actual pressure in Row 10.
- g. Record ram extension in Row 11 of Data Sheet 4.
- h. Stress tendon to gauge pressure recorded in Row 12 of Data Sheet 4. Record actual pressure in Row 13.
- i. Record ram extension in Row 14.

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8.2.11 Restore Tendon Force

NOTE

Following steps apply to any tendon which has lift-off force below its specified 90% Base Value, and has not been required to be detensioned.

- a. Completely de-tension the tendon and follow the instructions in Par. 8.2.10.
- b. Evaluate cause of low force.
- c. Retension tendon per the instructions in Para. 8.2.10.
- 8.2.12 For each tendon, measure the quantity of grease (corrosion protection medium, CPM) replaced and document on Data Sheet 11. Reinstall grease can and regrease per 1410-Y-83.
- 8.3 Vertical Tendon Inspection
 - a. Follow same steps for dome and hoop tendons (Section 8.1 and 8.2) with following exceptions:
 - Working platforms remain stationary during test of one tendon.
 - Access to opposite end of tendon is from tendon gallery.
 - Entire column of grease may drain from tendon conduit. Ensure sufficient receptacles available to contain up to 120 gallons of drained grease from each tendon (C-1101-153 E410-031).
 - Lift-off, detensioning, and retensioning of vertical tendon will be performed from one end only; i.e., from top of ring girder.
 - Data to be filled in on Data Sheets 1 and 2.
- 8.4 Concrete Cracks at Dome Tendon Anchorage Area
 - a. Visually inspect the 9 dome tendon anchorage areas per Enclosure 6.
 - b. Complete Data Sheets 8 and 9 of Enclosure 6.
- 8.5 Perform VT-3C examination of accessible exterior of the containment and document results per instructions in Enclosure 6.

| NOTE | |
|---|--|
| This examination is to include the concrete repair from the SGRP Containment Opening. | |

8.6 Perform 40 Year examinations and tests listed in Enclosure 7 and document results.

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8.7 Grease Can Seal Repairs

NOTE

To maintain tendon grease seals, scope of work includes replacement of leaky seals, even on tendons which are not part of surveillance scope listed in Table 1 and Table 2 of Enclosure 2 and Table 1 and Table 2 of Enclosure 9.

- 8.7.1 Perform repairs per 1410-Y-83 (Reference 2.15).
- 8.8 Recalibrate all calibrated equipment at end of tendon surveillance.
- 8.9 Augmented inspection for SGRP Containment Opening

NOTE

This is a one-time augmented inspection following the repair and restoration of the SGRP Containment Opening. The scope of this inspection is limited to the concrete patch, affected tendons and their anchorage areas per Enclosure 6. This augmented inspection does not include 100% examination of accessible concrete nor the full tendon sample of a regularly scheduled inspection.

- 8.9.1 Perform this one-time inspection 1 year (± 3 months) following repair and restoration of the SGRP Containment Opening.
- 8.9.2 Augmented tendon inspection for SGRP Containment Opening
 - 8.9.2.1 Follow same steps for hoop and vertical tendons (sections 8.1, 8.2 and 8.3).
 - 8.9.2.2 Inspect SGRP Containment Opening tendons per Enclosure 9.
- 8.9.3 Augmented concrete inspection
 - 8.9.3.1 Perform VT-3C examination of SGRP Containment Opening concrete repair and concrete around tendon anchorage areas of all tendons listed in Enclosure 9.
 - 8.9.3.2 Document results per Enclosure 6.

9.0 ACCEPTANCE CRITERIA

- 9.1 Tendon Anchorage and concrete inspection meets criteria specified by Enclosure 6.
- 9.2 Tendon Wire Physical Condition meets criteria specified by Enclosure 4.

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- 9.3 Tendon Prestress Force Confirmation Test (IWL-3221.1)
 - 9.3.1 The average of all normalized tendon lift-off forces, including those measured in 9.3.2.2, for each type of tendon (original vertical, dome, hoop and SGRP affected vertical and hoop) is equal to or greater than the required minimum average tendon force at the anchorage for that type of tendon.

NOTE

SGRP affected tendons are to be averaged separately from original tendons because the higher forces in the SGRP tendons would introduce a non-conservative bias in the average force calculations of the original tendon populations

NOTE

Required minimum average tendon forces are:

1033 Kips for Vertical Tendons 1064 Kips for Dome Tendons 1108 Kips for Hoop Tendons

- 9.3.2 The measured force in each individual tendon is not less than 95% of the Predicted Base Value (Predicted Force) obtained from C-1101-153-E410-046, unless the following conditions are satisfied:
 - 9.3.2.1 The measured force in not more than one tendon is between 90% and 95% of the predicted force;

NOTE

Tendons H46-24 and V-31 were de-tensioned during Surveillances 2 and 3, respectively. Also, the V-30 liftoff force was measured during Surveillance 4 and its anchorage force may have been affected during by this activity. To ensure that tendons adjacent to specified sample tendons are also in an undisturbed condition, the following are designated as the adjacent tendons to examine should the need for such examination arise.

V-29 is the designated adjacent tendon located counter-clockwise from specified sample tendon V-32.

H46-23 is the designated adjacent tendon located below specified sample tendon H46-25.

Also, the Responsible Engineer may designate alternatives to the above or to other adjacent tendons as necessary to satisfy accessibility, safety and other significant concerns.

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| | | grity rena | | |
| | | 9.3.2.2 | The measured forces in two tendons located ac are not less than 95% of the predicted forces (F | |
| | | 9.3.2.3 | The measured forces in all the remaining samp 95% of the predicted force. | le tendons are not less than |
| | 9.3.3 | including | uirements of 9.3.1 and 9.3.2 are not met, extent o additional lift-off testing to determine cause and ex nined by COGNIZANT MECHANICAL/STRUCTUF | xtent of such occurrence, shall |
| | 9.3.4 | Value, ev specify ad | average value of selected tendon end forces required for lift-off falls below 90% Ba alue, evaluate condition to determine extent of cause of the low lift-off force and to ecify additional examinations deemed necessary to demonstrate acceptability of th e-stressing system. | |
| | 9.3.5 | additional | F minimum group average normalized tendon force is NOT MET on Data Sheet 5, Idditional sample of 4% with a minimum of 4 and a maximum of 10, of same group endons, should be inspected. (TMI-1 Guidance/not Reg. Guide). | |
| | 9.3.6 | mean for finish date and exter MECHAN | of the anchorage force statistical analysis show a any tendon group will fall below the minimum requ of next scheduled surveillance, additional lift-off at of such occurrence shall be done as directed by IICAL/STRUCTURAL ENGINEER. This evaluatio ng Evaluation Report prescribed in IWL-3300. | uired value prior to the late testing to determine the cause the COGNIZANT |
| | 9.3.7 | | opulation of each group of sampled tendons meets ent shall be considered acceptable. | s criteria, structural integrity of |
| | 9.3.8 | 72 hours, | ral integrity of containment has not been demonst then be in at least HOT STANDBY within next 6 h WN within following 30 hours. | |
| 9.4 | Corrosi | on Protectio | n System Inspection. | |
| | 9.4.1 | Grease sa Enclosure | ample contaminant levels and base numbers mee 3. | t the criteria specified in |
| | 9.4.2 | Water in g | grease sample shall be that ratio of water to dry w | eight does not exceed 10%. |
| | 9.4.3 | (CPM) rei duct volui | ptance criteria limit is that the absolute difference moved from a tendon and the amount replaced sh ne (volume of end cap, trumpet, and duct less tha s). Engineering evaluation is required if the 10% o | all not exceed 10% of the net t of the tendon, anchor heads, |
| | 9.4.4 | Presence | of free water. | |
| | | a. | An evaluation per CC-AA-309-101 shall be per found. | formed per UFSAR 5.7.5.2.5 if |

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- 9.4.5 Grease leakage detected during general examination of the containment exterior surface has been evaluated for housekeeping, fire safety and personnel safety concerns.
 - a. An evaluation per CC-AA-309-101 shall be performed per UFSAR 5.7.5.2.5 if found.
- 9.5 Post Test Calibration
 - 9.5.1 The post test calibration shall not differ from the pre-test calibration by more than the specified accuracy tolerance of hydraulic rams and gauges (IWL 2522[b]).
- 9.6 All Data Sheets complete and signed off.
- 9.7 **IF** the Acceptance Criteria of 9.1, 9.2, 9.3, 9.4 and 9.5 are not met, it shall be considered as a possible abnormal degradation of the containment structure. The condition shall be immediately brought to the attention of, and evaluated by the COGNIZANT MECHANICAL/STRUCTURAL ENGINEER, a Surveillance Deficiency Report (SDR) generated, and addressed in the tendon surveillance report submitted to the NRC.

10.0 **<u>REPORTS</u>**

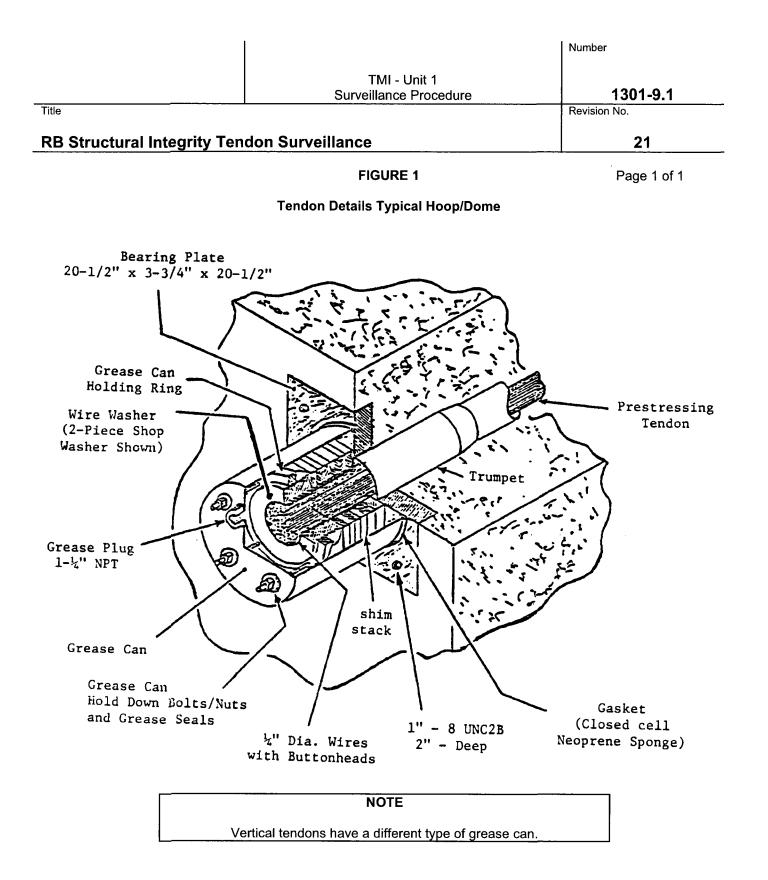
- 10.1 CONTRACTOR should prepare written report of results and conclusions for inspection period for TMI within 30 days of test and inspection completion.
 - 10.1.1 CONTRACTOR shall include pre and post-test calibration records in CONTRACTOR'S final report.
- 10.2 TMI shall ensure Enclosure 7 is kept updated with extra commitments for inspections as a result of abnormal conditions in each inspection period.
- 10.3 TMI shall submit a report on tendon surveillance to NRC within 3 months following completion per Tech Specs.

NOTE In addition to the 3 month report submitted to the NRC, tendon surveillance engineer should provide data listed below to the ISI engineer for the 90 day ISI Summary Report.

- 10.4 TMI shall submit an ISI Summary Report per IWA-6000. It should include the following conditions, if found (10CFR50.55a).
 - 10.4.1 Sampled sheathing grease contains chemically combined water exceeding 10% by weight or the presence of free water.
 - 10.4.2 The absolute difference between amount of grease removed and amount replaced exceeds 10% of the tendon net duct volume, i.e., 12 gallons for vertical tendons, 11 gallons for hoop tendons, and between 7 gallons and 9 gallons for dome tendons (dependent on length), (Source: C-1101-153-E410-031, 032, and 033, respectively).
 - 10.4.3 Grease leakage is detected during general visual examination of containment surface.

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- 10.4.4 When conditions in accessible areas could indicate the present of, or the result of degradation in inaccessible areas, those inaccessible areas shall be evaluated for --
 - 10.4.4.1 description of the type and extent of degradation, and the conditions that led to the degradation
 - 10.4.4.2 an evaluation of each area and results of same
 - 10.4.4.3 a description of necessary corrective actions.
- 10.4.5 When the elongation corresponding to a specific load (adjusted for effective wires or strands) during retensioning of tendons differs by more than 10 percent from that recorded during the last measurement



| | | | I | DATA SH Lift-Off Force N | | | | 1301-9.1 Revision 2 Page 1 of 7 | |
|---|----------------------------|---|--|--|---|---|--------------|---|---|
| Surveillance | e No | Tendon ID | Predic | cted Force $(F_p)_{p}$ | kip | Tendon En | d (Circle On | e): Shop / | Field |
| Phase (Circ | cle One): As-found / | Re-Tension | Ram ID | | Ram Calibrat | ion Constants: A | = | k = | |
| Date | Temp: F | RB Interior | _°F / Concrete Surface | ۰F | No. Effective | Wires, N _w | Shim St | ack Ht | in. |
| | | DO NOT EXCEEP A | A RAM PRESSURE OI | CAUTION F [(1,592 x N _w / 7 | 169) – k] x 1,000 |)/A = | psig | | |
| Trial 1 2 3 4 5 6 7 8 9 10 | Lift-Off Pressure, psig | | psig ^{1,2} N/A | At Feeler Ga | At Trial 1 At Trial 2 At Trial 3 At Trial 4 At Trial 5 At Trial 6 At Trial 7 Sum | ner Rotation Rotation, Turns CW or CCW | | Nominal TI Each Shim Shim in Co | on Only, Lis hickness of Starting at ontact with orhead in. """"""""""""""""""""""""""""""""""" |
| ² Re-tension | | , – k) x 1,000 / A = I Lift-Off Force < 13 | psig < P' < P' _{ma} 94 x N _w / 169; | < | | Ye | s / No(Circ | le One) | |
| n 0 of 52 | | | | 29 | | | | | |

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DATA SHEET 2 As-Found Lift-Off Force Summary Results

As-Found Lift Off Force, kip Predicted $F > F_{acc}$ $F > F_{llim}$ Circle Circle Tendon Force, F_{P'} F_{acc} = F_{llim} = Average 0.95 Fp 0.90 Fp Group ID kip Yes or No Shop End Field End Force, F Yes or No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Hoop Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No N/A Yes / No Yes / No N/A Yes / No Yes / No N/A Yes / No Yes / No N/A Yes / No Yes / No Vertical N/A Yes / No Yes / No Yes / No N/A Yes / No N/A Yes / No Yes / No N/A Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Dome Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No

Notes: (Initial & Date) _____

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| | DATA SHEET 4 | Page 1 of 4 |
| | Elongation / Tendon Force Record Re-Tensioning Data for De-Tensioned Tendons | |
| Tendon ID | Surveil | lance No |
| | Part 1 | |
| | Original Stressing Data | |
| | NOTE |] |
| | PTF force is that equivalent to a ram pressure of 1,000 psi. PTF re tendon slack and is the starting point for elongation measurements. force is 80% (may be less) of tendon ultimate strength. The tendon loaded to OSF in order to provide the required force distribution. It the force at which final elongation is measured. PTF force / elongation is measured. | OSF is is also |

OSF force / elongation and number of effective wires are documented in

Table 1

Shop End PTF Force

Field end PTF force

Shop End OSF Force

Field end OSF force

Mean PTF Force = (R1 + R2)/2

Shop End PTF Reference Distance

Field End PTF Reference Distance

Mean OSF Force = (R7 + R8)/2

Shop End OSF Reference Distance

Field End OSF Reference Distance

Differential Elongation = R12 - R6

Elongation Rate = R14 x R15 / R13

Differential Force = R9 - R3

Number of Effective Wires

Net OSF Reference Distance = R10 + R11

32

Net PTF Reference Distance = R4 + R5

Parameter

construction records.

Row, R

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

Number

Value

kip

kip

kip

in.

in.

in.

kip

kip

kip

in.

in.

in.

kip

in.

| | | TMI - Unit Surveillance Pro | | Number | 301-9.1 |
|--------|----------------------|---|--|------------------|-------------|
| Title | | Sulveillance i to | | Revision No | |
| RB Str | uctural Ir | ntegrity Tendon Surveillance | | | 21 |
| | | DATA SHEET Elongation / Tendon For Re-Tensioning Data for De-Ten | rce Record | | Page 2 of 4 |
| Tendon | ID | | | Surveillance No. | |
| | | Part 2 | | | |
| | | Shop End Re-Tension | ing Data | | |
| Ram ID | | Ram Area, A | in ² | Ram k | kip |
| | | NOTE | <u>. </u> | | |
| | | The number of effective wires entered in R1 number entered for the field end in Table 3. identified in Rows 4, 16, 18 & 19 (shaded) m work at both ends of the tendon is complete. | Also, the calcu | lations | |
| | [| Table 2 | | |] |
| | Row, R | Parameter | Value | Signature | Date |
| | 1 | Number of Effective Wires | | | |
| | 2 | PTF Target Pressure | 1,000 psi | | |
| | 3 | PTF Actual Pressure | psi | | |
| | 4 | PTF Actual Force = R3 x A/1000 - k | kip | | |
| | 5 | PTF Reference Distance | in. | | |
| | 6 | OSF Maximum Force = R1 x 9.4 | kip | | |
| | 7 | OSF Max. Pressure = 1000 (R6 + k) / A | psi | | |
| | 8 | 1/3 Pressure Interval = R7 / 3 – 330 | psi | | |
| | 9 | Target 1/3 Pressure = 1,000 + R8 | psi | | |
| | 10 | Actual 1/3 Pressure | psi | | |
| | 11 | 1/3 Reference Distance | in. | | |
| | | | | | |
| | 12 | Target 2/3 Pressure = R9 + R8 | psi | | |
| | 12 13 | Target 2/3 Pressure = R9 + R8 Actual 2/3 Pressure | psi psi | | |
| | | | | | |
| | 13 | Actual 2/3 Pressure | psi | | |
| | 13 14 | Actual 2/3 Pressure 2/3 Reference Distance | psi in. | | |
| | 13 14 15 | Actual 2/3 Pressure 2/3 Reference Distance OSF Actual Pressure | psi in. psi | | |
| | 13 14 15 16 | Actual 2/3 Pressure 2/3 Reference Distance OSF Actual Pressure OSF Actual Force = R15 x A/1000 – k | psi in. psi kip | | |

| | | TMI - Unit Surveillance Pro | | | 1301-9.1 | | |
|--------|-------------|--|--|----------|--------------|------------|--|
| ïtle | | | | | Revision No. | | |
| RB St | ructural li | ntegrity Tendon Surveillance | •••••••••••••••••••••••••••••••••••••• | | | 21 | |
| | | DATA SHEET Elongation / Tendon For Re-Tensioning Data for De-Ter | rce Record | ons | Pa | age 3 of 4 | |
| endor | י. ו ID | | | Surveill | ance No | | |
| | | Part 3 | | | | | |
| | | Field End Re-Tensioni | ng Data | | | | |
| Ram ID |) | Ram Area, A | _ in ² | Ram k | · | _ kip | |
| | | NOTE | | | | | |
| | | The number of effective wires entered in R1 number entered for the shop end in Table 2. identified in Rows 4, 16, 18 & 19 (shaded) m work at both ends of the tendon is complete. | Also, the calcu | ulations | | | |
| | | Table 3 | · _ · | | | | |
| | Row, R | Parameter | Sig | nature | Date | | |
| | 1 | Number of Effective Wires | | | | | |
| | 2 | PTF Target Pressure | 1,000 psi | | | | |
| | 3 | PTF Actual Pressure | psi | | | | |
| | 4 | PTF Actual Force = R3 x A/1000 - k | kip | | | | |
| | 5 | PTF Reference Distance | in. | | | | |
| | 6 | OSF Maximum Force = R1 x 9.4 | kip | | | | |
| | 7 | OSF Max. Pressure = 1000 (R6 + k) / A | psi | | | | |
| | 8 | 1/3 Pressure Interval = R7 / 3 - 330 | psi | | | | |
| | 9 | Target 1/3 Pressure = 1,000 + R8 | psi | | | | |
| | 10 | Actual 1/3 Pressure | psi | | | | |
| | 11 | 1/3 Reference Distance | in. | | | | |
| | 12 | Target 2/3 Pressure = R9 + R8 | psi | | | | |
| | 13 | Actual 2/3 Pressure | psi | | | | |
| | 14 | 2/3 Reference Distance | in. | | | | |
| | 15 | OSF Actual Pressure | psi | | | | |
| | 16 | OSF Actual Force = R15 x A/1000 - k | kip | | | | |
| | 17 | OSF Reference Distance | in. | | | | |
| | | | | | | | |
| | .18 | Differential Force = R16 - R4 | kip | | | | |

Number

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Number

Revision No.

RB Structural Integrity Tendon Surveillance

DATA SHEET 4 Elongation / Tendon Force Record **Re-Tensioning Data for De-Tensioned Tendons**

TMI - Unit 1

Surveillance Procedure

Surveillance No. _____

| Part 4 |
|------------------------------|
| Elongation Comparison |

| | Table 4 | | | | | | |
|--------|---|-------|--|--|--|--|--|
| Row, R | Parameter | Value | | | | | |
| 1 | Shop End Differential Force from Table 2, R18 | kip | | | | | |
| 2 | Field End Differential Force from Table 3, R18 | kip | | | | | |
| 3 | Average Differential Force = (R1 + R2) / 2* | kip | | | | | |
| 4 | Shop End Differential Elongation from Table 2, R19 | in. | | | | | |
| 5 | Field End Differential Elongation from Table 3, R19 | in. | | | | | |
| 6 | Total Elongation = R4 + R5** | in. | | | | | |
| 7 | Number of Effective Wires from Table 2, R1 | | | | | | |
| 8 | Re-Tensioning Elongation Rate = R6 x R7 / R3 | | | | | | |
| 9 | Original Elongation Rate from Table 1, R16 | | | | | | |
| 10 | Fractional Difference in Rates = (R8 – R9) / R9 | | | | | | |

Absolute value of the above Fractional Difference in Rates ≤ 0.1

* For vertical tendon = R1

** For vertical tendon = R4

Signature: _____ Date: _____

Title

Tendon ID _____

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Page 4 of 4

1301-9.1

Yes _____

No _____

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DATA SHEET 5 Average of the Normalized Lift Off Force

| <u>Tendon ID</u> | (1) Lift Off <u>Force</u> | (2) Normalizing <u>Factor (NF)</u> | (3) Normalized <u>Lift Off (1) + (2)</u> | (4) Acceptance <u>Yes No</u> |
|------------------------------------|---------------------------------|--|--|---|
| Dome Tendons | | | | |
| 1. | | | | (Average Equal to or greater than 1064 kips) |
| Vertical Tendons | | Total Avera | ge | |
| 1. | | | | (Average Equal to or greater than 1033 kips) |
| Hoop Tendons | | Total Avera | ge | |
| 1. | | | | (Average Equal to or greater than 1108 kips) |
| Cognizant Mech/Struct Reviewed By: | - | Total Avera | ge Date: | |
| Performed By: | | | Date: | |

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DATA SHEET 6 Retensioning Criteria Confirmation

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| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---------------------------------|---|---|------------------------|-------------------|-------------------------|
| TENDON ID | NUMBER OF EFFECTIVE WIRES | 70 % OF ULTIMATE STRENGTH [8.24 X (2)] | PREDICTED BASE FORCE ¹ | AVERAGE [(3)+(4)]÷2 | LOCK-OFF FORCE | (4)<(6)<(3) Yes / No |
| DOME | | | | | | |
| SHOP END | | | <u></u> | <u></u> | <u></u> | <u></u> |
| FIELD END | | | | | | |
| SHOP END | | | | <u></u> | | |
| FIELD END | | | | | | |
| VERTICAL | | | | | | |
| SHOP END | | | <u></u> | | | |
| SHOP END | | | | | | |
| SHOP END | | <u></u> | | <u> </u> | | |
| HOOP TENDONS | | | | | | |
| SHOP END | · | | | | | |
| FIELD END | | | | | | <u> </u> |
| SHOP END | | <u></u> . | | | <u> </u> | |
| FIELD END | | | | | | |
| SHOP END | | | | | | |
| FIELD END | | | <u> </u> | <u> </u> | <u></u> | |
| Cognizant Mech/Struct E Reviewed By: | | | | Date | : | |
| Performed By: | | | | Date | : | |

¹ Predicted Base Force from DC-5390-225.01-SE or separate calculation.

DATA SHEET 7 Tendon Force Measurement Record

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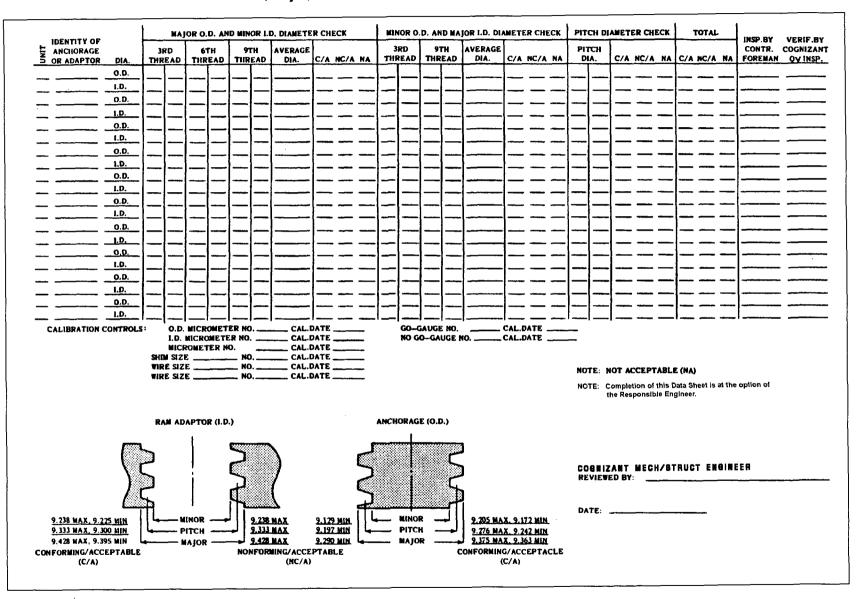
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DATA SHEET 8

Minor, Major, and Pitch Diameter Checks - Anchorage and Ram Adapter



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DATA SHEET 9 Tendon Anchorage Area Moisture/Free Water Inspection

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| | Inspection | Period | | | | | |
|-------------|---------------|-------------|--------------------------------|---------------------|--|------------|---------------------------|
| | Tendon No. | Location | Moisture/Water (Yes or No) | Description of Fre | ee Moisture/Water-Quantity, Location | Date Insp. | Inspect. By (Initials) |
| 1. | | | | | | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| 4. | | | | | | | |
| 5 | | | | | | | |
| 6. | | | | | | | |
| 7. | | | | | | | |
| 3 | | | | | ·· | | |
| 9. <u> </u> | | | | | | | |
| 0. | | | | | | | |
| 1. | | | | | | | |
| 12 | | | | | | | |
| DTE: | Locatio | on: | | | | | |
| <u> </u> | | Tendons: | 1 to 6 - Buttress | | Cognizant QV Inspector | | |
| | Vertica | al Tendons: | end of te T or B - Top or B | | Verification By: | Date | e: |
| | | Tendons: | | of buttress nearest | Cognizant Mech/Struct Engineer Review By: | Date | ə: |

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DATA SHEET 10 Tendon Anchor Head Rotation Inspection

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DATA SHEET 11 **Tendon Surveillance Program**

| | | | Gallons Remo | ved* | | Gallons F | Replaced* | _ | |
|---------------|-------------|-------------------------|---------------------------------|--|--------------------------|--------------|---------------------------------|--|-------------------------|
| Tendon No. | Shop End | Field End | Sum (Q₁) Shop & Field End | Net Duct Volume, (Q _N), Gallons | Shop End | Field End | Sum (Q₂) Shop & Field End | 100 x (Q ₂ - Q ₁) / Q _N ,% | Acceptabl (Yes or No |
| | | | | | | | | $100 \times (02 - 01) / 00, 10 - 00$ | (103 01 14 |
| | | | | | <u> </u> | | <u> </u> | **** | |
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| | | <u> </u> | . <u> </u> | | | | | | |
| _ | | | | | | | | | |
| | | ical tendo ment of g | ons may be use | ed for | Cognizant Verificatio | t QV Insp | ector | _ `. | |

*

| | | | Number | | | | | | | | |
|------------------------------------|--|-----------------|--------|-----------|--|--|--|--|--|--|--|
| | TMI - Unit 1 Surveillance Procedure | e | 1301 | -9.1 | | | | | | | |
| Title | e | | | | | | | | | | |
| RB Structural Integrity Ten | 2 [,] | 1 | | | | | | | | | |
| | DATA SHEET 12 | | Page | 1 of 1 | | | | | | | |
| VT- | 1, VT-3, VT-1C, and VT-3C Examine | r Qualification | | | | | | | | | |
| Name of Examiner | Employer | Method | I | Level | | | | | | | |
| | | <u></u> | | | | | | | | | |
| | | | | | | | | | | | |
| | | <u> </u> | | <u> </u> | | | | | | | |
| | | | | | | | | | | | |
| | <u></u> | · · · | | <u></u> _ | | | | | | | |

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 | | | |
|-------------------------|--------------|-------|-------------|------------|
| | Registration | State | License No. | Expiration |
| | Signature | | Date | |
| Exelon NDE Services Con | currence | | | Date |
| ANII Concurrence | | | | Date |

| | | TMI - Unit 1 | Number |
|-------------------------------------|----------------------------|----------------------|-------------|
| | Surve | 1301-9.1 | |
| Title | | Revision No. | |
| RB Structural Integrity Tend | on Surveillance | <u> </u> | 21 |
| | DATA | SHEET 13 | Page 1 of 1 |
| Re | e of Contractor Procedures | | |
| Procedure Number / Title | Revision | Reviewed/Accepted by | Date |
| | | | |
| | | <u> </u> | |
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Number

TMI - Unit 1 Surveillance Procedure

Revision No.

RB Structural Integrity Tendon Surveillance

Title

ENCLOSURE 1

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21

Stressing Ram Calibration

170 Wire Stressing Equipment

NOTE

Calibration will demonstrate a \pm 1.5% accuracy of complete stressing unit within the calibration range specified in this enclosure.

- 1. Attach entire stressing system to a 1600 K load cell which has been calibrated traceable to NIST.
- 2. Check unit at 3 ram extensions of 25%, 50%, and 75% of full extension and at loads specified on attached data sheet.
 - 2.1 Bring stressing unit to gauge pressures equivalent to pressures listed on Data Sheet of this enclosure, and record actual force as read from load cell.
- 3. Record and plot values on a Gauge Pressure versus Force Chart to establish current ram calibration constants for each jack.
- 4. Date all calibrations and paint (or inscribe, attach cal sticker, etc.) calibration date on stressing unit.
- 5. Maintain 1 copy of current calibration with stressing unit at job site.
- 6. Include calibration data and certificate in surveillance report.

ENCLOSURE 1 Data Sheet **Stressing Ram Calibration**

RAM DESCRIPTION

| LOAD CELL C | ONSTANT | | | | | | | | |
|---------------------------------|---|--------------------|--------------------|----------------------|-----------|----------------------|------------|---------------------------|--|
| RAM TARGET LOAD (KIPS) | CALCULATED TARGET PRESS. (PSIG) | AT 25% = LOADII | NG #1 | AT 50% = _ LOADIN | G #2 | AT 75% = _ LOADIN | G #3 | AVERAGE LOAD (KIPS) | |
| <u> </u> | | LOAD CELL | (KIPS)* | LOAD CELL | (KIPS)* | LOAD CELL | (KIPS)* | | |
| <u>150K</u> | | | <u> </u> | | | | | | |
| <u>300K</u> | | | | | | | | | |
| <u>500K</u> | | | | | | | | | |
| <u>600K</u> | | | | · | | | | | |
| <u>700K</u> | ······ | | <u>-,</u> | | | | | | |
| <u>800K</u> | · | | | | | | | | |
| <u>900K</u> | | | | | | | | | |
| <u>1000K</u> | | | | | | l | | | |
| <u>1100K</u> | | | | | <u> </u> | | | | |
| <u>1200K</u> | | | | | | | | | |
| <u>1300K</u> | | | | | | | | | |
| <u>1400K</u> | | | | | | | | | |
| <u>1500K</u> | · | | | | | | | | |
| <u>1600K</u> | | | | | | | | | |
| | | | | | | | | | |
| USING THE M | ATION CONSTANT IETHOD OF LEAST TIFICATIONS OF N | SQUARES. AF | REAIN ² | INTERNAL RESI | STANCE(K) | AIGHT LINE FIT | TED TO AVI | | ND PRESSURE DATA OAD CELL CONSTANT |
| | Y COGNIZANT ME | CH/STRUCT EN | IGINEER: | | | | | DATE | ······································ |
| | Y LABORATORY T | | | | | | | DATE | |
| | LABORATORY SU | PERVISOR: | | | | | | DATE | |
| on 0 3 of 523 | LABORATORY SU | | | 2 | 46 | | | | |

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ENCLOSURE 2

Scope of Each Regularly Scheduled Surveillance (Random Selection Per GAI DC-5930-225.02-SE) For Scope of the 2010 Augmented Surveillance, See Enclosure 9

| TABLE 1 |
|---|
| Selected Tendons and Corresponding Inspection Periods |

| | | | _ | | | | RTICA | _ TEN | DONS | 5 | | |
|--------|---|-----|---|----------|-------|----------|-------|-------|----------|--|----------------|-----------------------|
| | | | | INS | PECTI | ON PE | RIOD | | | | | Comments |
| Tendon | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Times Insp. | (Adjacent Tendons) |
| 11 | | | | 1 | | | | | X | | 1 | Done |
| 14 | | | | X | | | | | | | 1 | Done |
| 16 | X | | | | | | | | | | 1 | Done |
| 18 | | • | Х | | | | | | | | 1 | Done |
| 22 | | | | | X | | | | | | 1 | Done |
| 24 | | Х | | | I | | | | | | 1 | Done |
| 27 | X | | | | | | | | | | 1 | Done |
| 30 | | | | X | | | | | | | 1 | Done |
| 31 | | | X | | | | | | | | 1 | Done |
| 32 | | | | X | | X | X | Х | X | Х | 6 | 29, 33 Control |
| 40 | | | | | | | X | | | | 1 | Done |
| 48 | | X | | | | | | | | | 1 | Done |
| 50 | | | | | X | | | | | | 1 | Done |
| 53 | | | | <u> </u> | | | | Х | | | 1 | 52, 54 |
| 55 | | | X | | | | | | | | 1 | Done |
| 61 | X | | | | | <u> </u> | | | | | 1 | Done |
| 66 | | | | | | | | Х | | | 1 | 65, 67 |
| 72 | | X | | | | | | | | | 1 | Done |
| 78 | | | | | | X | | | | | 1 | Done |
| 84 | 1 | | | X | X | 1 | | | | | 2 | Done |
| 86 | X | | | | | | | | | | 1 | Done |
| 90 | | | | | | _ | | | X | | 1 | Done |
| 97 | | X | | | | | | | | | 1 | Done |
| 105 | | | X | | | | | | | | 1 | Done |
| 108 | | | | | | | | | | X | 1 | 107, 109 |
| 114 | | | | | | | X | | | | 1 | Done |
| 119 | | X | | | | | | | | | 1 | Done |
| 126 | | | | | | X | | | | | 1 | Done |
| 132 | | | | | | | | | X | | 1 | Done |
| 138 | 1 | | Х | | | | | | | | 1 | Done |
| 140 | | | | | | ľ | | Х | | | 1 | 139, 141 |
| 146 | | | | | | | | | | | 1 | Reference TR 203 |
| 152 | | | | | | 1 | | | | X | 1 | 151, 153 |
| 158 | X | i – | | 1 | | [| | | | 1 1 | 1 | Done |
| 159 | 1 | | | | [| ľ | | | <u> </u> | X | | Replacement for 146 |
| 160 | 1 | | | | X | | 1 | | | and the second s | 1 | Done |
| 164 | | | | | | | X | | | | 1 | Done |
| TOTAL | 5 | 5 | 5 | 5 | 3 | 3 | 4 | 4 | 4 | 4 | 42 | X = Lift-Off |

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ENCLOSURE 2 Table 1 (Cont'd) Selected Tendons and Corresponding Inspection Periods

| | r | | | | PECTI | | OOP | END | /N3 | | <u> </u> | Comments |
|--------|---|---|---|---|-------|----------|-----|-----|-----|----|----------------|-----------------------|
| Tendon | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Times Insp. | (Adjacent Tendons) |
| 13-11 | | | | | | | | Х | | | 1 | 13-10, 13-12 |
| 13-28 | X | | | | | | | | - | | 1 | Done |
| 13-34 | X | i | | | | | | | | | 1 | Done |
| 13-36 | | | | Х | | | Ì | | | | 1 | Done |
| 13-41 | | | | | | | | | Х | | 1 | Done |
| 13-46 | X | | | | | | | | | | 1 | Done |
| 13-50 | | | | | | | Х | | | | 1 | Done |
| 24-19 | | X | | | | | | | | | 1 | Done |
| 24-20 | | | Х | | | | | - | | | 1 | Done |
| 24-21 | X | | | | | | | | | | 1 | Done |
| 24-23 | | | | | | <u> </u> | | | | х | 1 | 24-22, 24-24 |
| 24-26 | | | | X | | | | | | | 1 | Done |
| 24-28 | | | Х | | | | | | | | 1 | Done |
| 24-30 | | | | | Х | | | | | | 1 | Done |
| 24-33 | | | | | | | | | Х | | 1 | Done |
| 24-40 | | | | | | X | | | | | 1 | Done |
| 24-47 | X | | | | | | | | | | 1 | Done |
| 24-48 | | X | | | | | | | | | 1 | Done |
| 24-49 | | | Х | | | | | | | | 1 | Done |
| 24-50 | | | | | | | | | | X | 1 | 24-49, 24-51 |
| 24-51 | | | | | Х | | | | | | 1 | Done |
| 35-10 | X | | | | | | | | | | 1 | Done |
| 35-11 | | X | | | | | | | | | 1 | Done |
| 35-16 | | | х | | | | | | | | 1 | Done |
| 35-23 | | | | | | X | | | | | 1 | Done |
| 35-26 | | | | Х | | | | | | | 1 | Done |
| 35-28 | х | | | | | | | | | | 1 | Done |
| 35-29 | | Х | | | | | | | | | 1 | Done |
| 35-33 | | | | | | | Х | | | | 1 | Done |
| 35-47 | | | | | | X | | | | | 1 | Done |
| 35-49 | | | | | | | | X | | | 1 | 35-48, 35-50 |

X =Lift-OffX =Lift-Off & Wire Test

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ENCLOSURE 2 Table 1 (Cont'd) Selected Tendons and Corresponding Inspection Periods

| | 1 | | | INC | | ON PE | | | (Cont' | <u>uj</u> | T | Comments |
|--------|----|----|----|-----|---|-------|---|---|--------|-----------|----------------|-----------------------|
| Tendon | 1 | 2 | 3 | 4 | 5 | | 7 | 8 | 9 | 10 | Times Insp. | (Adjacent Tendons) |
| 46-24 | | Х | _ | | | | | | | | 1 | Done |
| 46-25 | | | | | | | | Х | | | 1 | 46-23, 46-26 |
| 46-28 | | Х | | | | | | | | | 1 | Done |
| 46-30 | | | Х | | | - | | | | | 1 | Done |
| 46-32 | | | Х | | | | | | | | 1 | Done |
| 46-34 | | | | | Х | | | | | | 1 | Done |
| 46-37 | | | | | | | Х | | | | 1 | Done |
| 46-50 | | | | | | | | | Х | | 1 | Done |
| 51-11 | | | Х | | | | T | | | | 1 | Done |
| 51-12 | X | | | | | | | | | | 1 | Done |
| 51-13 | | Х | | | - | | | | | | 1 | Done |
| 51-16 | | _ | | | | | | | | Х | 1 | 51-15, 51-17 |
| 51-43 | | | | | | | X | | | | 1 | Done |
| 51-49 | | | | | | | | | Х | | 1 | Done |
| 62-10 | X | | Х | | | | [| | | | 2 | Done |
| 62-11 | | Х | | | | | | | | | 1 | Done |
| 62-13 | | | | | Х | | | | | | 1 | Done |
| 62-16 | Х | | | | | | | | | | 1 | Done |
| 62-18 | | | | | | | | Х | | | 1 | 62-17, 62-19 |
| 62-26 | | | | Х | Х | X | X | Х | Х | Х | 7 | 62-25, 62-27 Control |
| 62-28 | | | Х | | | | | | | | 1 | Done |
| 62-30 | | | | Х | | | | | | | 1 | Done |
| 62-41 | | | | | | | | | | Х | 1 | 62-40, 62-42 |
| 62-47 | | Х | | | | | | | | | 1 | Done |
| 62-49 | | | | | | X | | | | | 1 | Done |
| 62-51 | | | X | | | | | | | | 1 | Done |
| 62-53 | | Х | | | | | | | | | 1 | Done |
| TOTAL | 10 | 10 | 10 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 65 | X = Lift-Off |

ENCLOSURE 2 (Cont'd) Table 1 (Cont'd) Selected Tendons and Corresponding Inspection Periods

| | <u> </u> | | | INS | PECTI | | | ENDO | | | | Comments |
|--------|----------|---|----------|-----|----------|----------|--------------|----------|----------|-----|----------------|-----------------------|
| Tendon | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Times Insp. | (Adjacent Tendons) |
| 101 | X | | | | | | | | | | 1 | Done |
| 102 | | | | | | | Х | | | | 1 | Done |
| 104 | | | | | | | X | | | | 1 | Done* |
| 116 | X | | | | | | | | | | 1 | Done |
| 122 | | | | | | | | | Х | | 1 | Done |
| 130 | | Х | | | | | | | | | 1 | Done |
| 131 | | | Х | | | | | | | | 1 | Done |
| 133 | | | | X | | | | | | | 1 | Done |
| 141 | | | | | | X | | | | | 1 | Done |
| 143 | | | | | | | | | | Х | 1 | 142, 144 |
| 145 | Γ. | | | | Х | | | | | | 1 | Done |
| 147 | | | X | | | | | | | | 1 | Done |
| 148 | | Х | | | | | | | | | 1 | Done |
| 201 | X | | | | | | | | | | 1 | Done |
| 202 | | X | | | | | | | | | 1 | Done |
| 203 | | | X | | | | | | | | 1 | Done |
| 213 | | | | | <u> </u> | | | X | | | 1 | 212, 214 |
| 218 | | | X | | X | | | | | | 2 | Done |
| 219 | | Х | | | <u> </u> | | | | | | 1 | Done |
| 220 | X | | | | | | | | | | 1 | Done |
| 225 | | | | X | | X | X | X | х | X | 6 | 224, 226 Control |
| 230 | | | | | | | | X | | | 1 | 229, 231 |
| 237 | | | | | <u> </u> | | | | _ | X | 1 | 236, 238 |
| 248 | | | | | | X | | | | | 1 | Done |
| 301 | X | | | | <u> </u> | <u> </u> | | | | | 1 | Done |
| 303 | | | | | | | | | | [X] | 1 | 302,304 |
| 313 | | | | | | | X | | | | 1 | Done |
| 314 | | | | Х | | | <u> </u> | | | | | Done |
| 316 | X | | | | <u> </u> | | <u>├</u> ─── | | | | 1 | Done |
| 322 | | | <u> </u> | | <u> </u> | <u> </u> | <u> </u> | | X | | 1 | Done |
| 334 | 1 | X | | | | | | | <u> </u> | | 1 | Done |
| 336 | 1 | | X | | | 1 | <u> </u> | <u> </u> | | | 1 | Done |
| 342 | | | | | | | | [X] | Х | | 1 | Done |
| 346 | <u> </u> | | X | | <u> </u> | | | | | | 1 | Done |
| 347 | | | <u> </u> | | x | | | | | | 1 | Done |
| 348 | | x | | | | | | | | | | Done |
| TOTAL | 6 | 6 | 6 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 42 | X = Lift-Off |

[X] = For plant on-line, inspect for corrosion, wire breakage and grease quality on end away from main steam relief valve zone. For plant off-line, perform all inspections including lift off measurements. Plant off-line inspections committed for Inspection Period 9.

* D104 is exempt from detensioning as insufficient clearance from the adjoining vent stack (Buttress 5) to successfully access the tendon end exists. D102 has been selected as D104's (Cycle 7) substitute tendon per IWL-2521.1. D104 shall be examined per Sections 8.2.1 through 8.2.6 and associated enclosures/data sheets completed (IWL-2521.1.[c]).

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ENCLOSURE 2 (Cont'd)

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Table 2

Tendons Selected for Detensioning and Tendon Wire Removal/Lab Tests

| Inspection | Tendon Location | | | |
|------------|-----------------|---------|-------|--|
| Period | Vertical | Ноор | Dome | |
| 1 | V-27 | H-35-10 | D-301 | |
| 2 | V-119 | H-62-47 | D-202 | |
| 3 | V-18 | H-46-30 | D-336 | |
| 4 | V-14 | H-35-26 | D-314 | |
| 5 | V-50 | H-46-34 | D-145 | |
| 6 | V-78 | H-35-47 | D-248 | |
| 7 | V-164 | H-13-50 | D-102 | |
| 8 | V-140 | H-46-25 | D-230 | |
| 9 | V-90 | H-51-49 | D-322 | |
| 10 | V-146 | H-24-23 | D-237 | |

Title

| | | | Number | | | |
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| | | ENCLOSURE 3 | Page 1 of 6 | | | |
| COLLECTION/LAB ANALYSIS OF FILLER GREASE | | | | | | |
| PURPOSE: | PURPOSE: Confirm the ability of filler grease to perform its intended corrosion protection function. | | | | | |
| LIMITS AND PRECAUTIONS: | | | | | | |
| 1. | Use Wooden or plastic paddles or spatulas to scoop out bulk filler grease from around the anchorage. DO NOT use metal implements. | | | | | |
| PROCEDURE | Ξ: | | | | | |
| 1. | Inspection Grease | | | | | |
| | 1.1 Co | tact TESTING LABORATORY to determine size of samp | ble required. | | | |
| | cor | e one random sample of bulk filler grease from tendon en tainer supplied either by TESTING LABORATORY or TE NTRACTOR. | | | | |
| | | ch an identification tag to container with tendon group, te specified. (Example: Dome 105NW) | endon number, and tendon | | | |
| 2. | Fresh Grease | resh Grease | | | | |
| | | nmercial Grade Dedication of new bulk filler grease requi els for <u>each</u> grease lot number be sampled for lab analys | | | | |
| | | ch an identification tag to each sample and correspondir pled. | g identification on each drum | | | |
| 3. | Old Grease (1 | <u>Old Grease</u> (to be reused) | | | | |
| | | ease obtained from tendons is intended to be reused to i ase") perform lab analysis on "old grease". | efill tendons (termed "old | | | |
| | | t each container of old grease to be reused to approximatiogeneous mixture. | ately 150° F to ensure a | | | |
| | 3.3 Atta | ch an identification tag to each sample and correspondir | g identification to each drum. | | | |
| 4. | Package all samples and ship to TESTING LABORATORY in such a way that condition of grease i not adversely affected or altered. | | | | | |
| | | | | | | |
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ENCLOSURE 3

5. Test lab perform corrosion protection medium analysis as follows (excerpt Table IWL-2525-1):

| Characteristic | Test Method | Acceptance Limit |
|-------------------------------------|--|------------------|
| Water Content | ASTM D 95 | 10% by weight |
| Water Soluble Chlorides | ASTM D 512 (Note [1]) | 10 ppm maximum |
| Water soluble nitrates | ASTM D 992 (Note [1]) | 10 ppm maximum |
| Water soluble sulfides | APHA 427 (Note [1]) (Methylene Blue) | 10 ppm maximum |
| Reserve Alkalinity (Base Number) | ASTM D 974 Modified (Note [2] and Note [4]) | (Note [3]) |

NOTES:

Title

- (1) Water Soluble Ion Tests. The inside (bottom and sides) of a one (1) liter beaker, approximate OD 105 mm, height 145 mm, shall be thoroughly coated with between 90 and 110 grams of the sample. The coated beaker is to be filled with approximately 900 ml of distilled water and heated in an oven at a controlled temperature of 100 degrees F +/- 2 degrees F for 4 hours. Water extraction is tested by the noted test procedures for the appropriate water soluble ions. Results are to be reported as PPM in the extracted water.
- (2) ASTM D 974 Modified. Place 10 g of sample in a 500 ml Erlenmeyer flask. Add 10 cc isopropyl alcohol and 5 cc toluene. Heat until sample goes into solution. Add 90 cc distilled water and 20 cc 1NH₂SO4. Place solution on a steam bath for 1/2 hour. Stir well. Add a few drops of indicator (1% phenolphtalein) and titrate with 1NNaOH until the lower layer just turns pink. If acid or base solutions are not exactly 1N, the exact normalities should be used when calculating the base number. The Total Base Number (TBN) expressed as milligrams of KOH per gram of sample, is calculated as follows:

 $TBN = \frac{[(20)(N_A) - (B)(N_B)]56.1}{W}$

Where,

 $\begin{array}{l} B = \mbox{milliiters NaOH} \\ N_A = \mbox{normality of } H_2 S04 \\ N_B = \mbox{normality of NaOH solution} \\ W = \mbox{weight of sample in grams} \end{array}$

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(3) The base number shall be at least 50% of the as-installed value, unless the as-installed value is 5 or less, in which case the base number shall be no less than zero. If the tendon duct is filled with a mixture of materials having various as-installed base numbers, the lowest number shall govern acceptance. Two kinds of bulk filler grease were used for the initial fill at TMI-1. These are 2090P and 2090P-2 both by Viscosity Oil Co. The 2090P was essentially neutral with a Base Number of zero. The 2090P-2 has a Base Number of 3. Expected Base Number for 2090P and 2090P-2 is zero or higher with a tolerance of -.5. Since reserve alkalinity was not reported on the certifications for 2090P and 2090P-2, the testing of samples of this grease is primarily to detect significant changes in Base Number over a period of time that might indicate abnormal degradation of the corrosion inhibiting properties, e.g., a trend developing where the grease is progressively becoming acidic over time.

Fresh new grease is 2090P-4 by Viscosity Oil Co. with a Base Number of 35. Acceptance Criteria for the fresh grease before it is mixed with existing grease is a Base Number of 17.5 or higher.

(4) Grease samples which exhibit reserve alkalinity number of <.5 shall be retested per the unmodified version of ASTM D974 Section 9 and an acid number generated for the sample. Both the reserve alkalinity number and the acid numbers shall be reported with the test results when this occurs. Acceptance criteria for Acid Number is that it must be < 1.

Data Sheet 1

Laboratory Analysis of Bulk Filler Grease

Dome Tendons

INSPECTION PERIOD

| SAMPLE IDENTIFICATION | TENDON END | CHLORIDES ⁽¹⁾ (PPM) | NITRATES ⁽¹⁾ (PPM) | SULFIDES ⁽¹⁾ (PPM) | WATER/DRY WEIGHT (2) <u>%</u> | RESERVE ⁽¹⁾ ALKALINITY (BASE NUMBER) |
|-----------------------------------|------------------|-----------------------------------|----------------------------------|----------------------------------|-------------------------------------|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | <u></u> | | |
| 4 | | | - 48 | | | |
| 5 | | | ti - Instrumente | | | |
| | | | | | | |
| (1) ACCEPTANCE C ENCLOSURE 3. | RITERION IS GIVE | N ON PAGE 2 OF | | TORY TECHNICIAN RED BY: | | _DATE: |
| (2) ACCEPTANCE C TENDON END: N | | IAXIMUM BY WEIGHT. | | TORY SUPERVISOR | | _DATE: |
| | | | | NT MECH/STRUCT E | | _DATE: |

Data Sheet 2

Laboratory Analysis of Bulk Filler Grease

Vertical Tendons

INSPECTION PERIOD

| <u>SAMPLE</u> IDENTIFICATION | TENDON END | CHLORIDES ⁽¹⁾ (PPM) | NITRATES ⁽¹⁾ (PPM) | SULFIDES ⁽¹⁾ (PPM) | <u>WATER/DRY</u> <u>WEIGHT (2)</u> <u>%</u> | <u>RESERVE⁽¹⁾ ALKALINITY</u> (BASE NUMBER) |
|---------------------------------|-----------------------------------|-----------------------------------|----------------------------------|----------------------------------|---|--|
| 1 | | | | | | |
| 2 | ····· | | | | | |
| 3 | | | | | | <u>.</u> |
| 4 | | | <u></u> | | | <u> </u> |
| 5 | | | | | | |
| | | | | | | |
| (1) ACCEPTANCE ENCLOSURE 3 | CRITERION IS GIVE | N ON PAGE 2 OF | | TORY TECHNICIAN | 1007 · | _ DATE: |
| | CRITERION IS 10% I TOP, BOTTOM | MAXIMUM BY WEIGHT. | | TORY SUPERVISOR | _ | _DATE: |
| | | | | ANT MECH/STRUCT E ED BY: | | DATE: |

DATE:_____

ENCLOSURE 3

Data Sheet 3

Laboratory Analysis of Bulk Filler Grease

Hoop Tendons

INSPECTION PERIOD

| SAMPLE IDENTIFICATION | TENDON END | CHLORIDES ⁽¹⁾ (PPM) | <u>NITRATES⁽¹⁾ (PPM)</u> | SULFIDES ⁽¹⁾ (PPM) | WATER/DRY WEIGHT (2) <u>%</u> | RESERVE ⁽¹⁾ ALKALINITY (BASE NUMBER) |
|----------------------------------|-------------------------------------|-----------------------------------|---|----------------------------------|-------------------------------------|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | <u> </u> | | | | | |
| 5 | | | <u></u> | | | |
| 6 | | | | | | |
| (1) ACCEPTANCE C ENCLOSURE 3. | RITERION IS GIVE | N ON PAGE 2 OF | | TORY TECHNICIAN RED BY: | | _DATE: |
| · · | RITERION IS 10% N BUTTRESS NUMBE | MAXIMUM BY WEIGHT. R | | Tory Supervisor D BY: | | _DATE: |
| | | | COGNIZ | ANT MECH/STRUCT E | NGINEER | |

APPROVED BY: _____

| Vumber | |
|--------|--|
|--------|--|

| TMI - U | nit 1 |
|----------------|-----------|
| Surveillance I | Procedure |

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ENCLOSURE 4

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TENDON RANDOM WIRE REMOVAL/PHYSICAL TESTING

(See Table 2 of Enclosure 2 and Table 2 of Enclosure 9 for tendons which require wire removal).

LIMITS AND PRECAUTIONS

- 1. Ensure proper identification of tendon before cutting and pulling test wire.
- 2. Use care to avoid damage to adjoining wires/buttonheads.
- 3. Avoid unnecessary marks on wire while removing it.

PROCEDURE

Title

1. IDENTIFY ONE PULLABLE WIRE

Select one of the protruding wires (with tendon totally detensioned) and tap on it, rotate, or pull while observing movement of buttonhead at other end to identify both ends. Confirm wire identification before cutting.

2. CUT

Cut off button head at opposite end from where puller will be installed.

3. INSTALL PULLER

Install wire puller and slowly commence pulling. Verify cut end starts moving through end washer.

4. PULL AND COIL

Use a come-along or some similar method to pull approximately 170 feet of wire. A cable gripper may be used to grip wire but avoid as much as possible making surface marks on the wire.

While pulling, coil wire to approximately six foot diameter and secure coil from unwinding.

WARNING

A coiled tendon wire has considerable spring force. Inadequate binding could result in violent uncoiling which could injure people.

5. TAG

Attach metal tag at the button headed end indicating following:

a. Tendon Number

| | | Number |
|------------------|---|--------------|
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| b. | Identify the button headed end (tagged) as: | |

- 1. TOP for vertical tendons.
 - 2. BUTTRESS NUMBER for hoop tendons.
 - 3. NW, NE, SW, or SE for dome tendons.

6. PACKAGE/STORE/SHIP

Wrap wire with plastic sheeting and tape securely to protect from elements.

7. LABORATORY TESTING

7.1 Clean and carefully inspect entire length of wire for pitting, corrosion, or other signs of deterioration.. Record this information on Data Sheet 1 of this enclosure.

NOTE Wire tests, and determination of elongation and yield strength, to conform to the requirements of ASTM A421 and, per reference therein, ASTM A370 or technically equivalent requirements.

7.2 CUT SAMPLES

Cut three (3) samples from each wire, one from each end and one from middle. A fourth sample shall be cut from the area of worst corrosion, if any (IWL-2523.2b). Length of each sample shall be maximum length acceptable for test apparatus being used. Areas shall be representative of any significant corrosion or pitting but should not include any cable gripper marks.

7.3 IDENTIFY LOCATION OF SAMPLES

Show on Data Sheet 1 of this enclosure, location along wire length where each sample was taken.

| | | | | Number |
|-------|---------------|-----------------|--|-------------------|
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| | 7.4 | TENSIL | E TEST | |
| | | a. | Determine YIELD STRENGTH, ULTIMATE TENSILE STREN ELONGATION AT ULTIMATE TENSILE STRENGTH. | IGTH, and PERCENT |
| | | b. | Record this data on the Data Sheet 2 of this enclosure. | |
| | | C. | Produce stress strain curves for each test section. | |
| ACCE | <u>EPTANC</u> | <u>E CRITER</u> | IA - TENDON RANDOM WIRE PHYSICAL TESTING | |
| | Nin fai | | ninimum munnets ad ultiments at a store state of 0.40,000 unit | |

- 1. No failure below minimum guaranteed ultimate stress of 240,000 psi.
- 2. Elongation at failure is not less than 4%.

- 3. Wire shows no evidence of damage or active corrosion.
- If there is rejectable corrosion on the wire, or the wire fails the tensile test, the <u>Cognizant</u> <u>Mechanical/Structural Engineer</u> must evaluate. Each case shall be treated as an abnormal degradation of the containment structure and reported to the NRC.

| | | Number |
|----------------------------------|---|------------------------------|
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| | ENCLOSURE 4 Data Sheet 1 Tendon Wire Inspection Data | Page 4 of 5 |
| INSPECTION PERIOD | | |
| Tendon Identification: | | |
| 0 | 25' | |
| 25' | 50' | |
| 50' | 75' | |
| 75' | | |
| 100' | 125' | |
| 125' | 150' | |
| 150' | | |
| 175' | 180' | |
| 180' | 185' | |
| 185' | 190' | |
| | Wir | re Sample Diameters |
| Sample for Tensile Tes | <u>At 1/4-Points</u> | At Breaking <u>Points</u> |
| Sample 1: | ft toft | · |
| Sample 2: | ft toft | |
| Sample 3: | ft toft | |
| | NOTE | |
| as s 2. Sar or p 3. Dia | rrosion or any signs of deterioration shall be indi- shown on the above chart. nple shall include areas representative of signifi- bitting <u>if</u> they exist on removed tendon wire. meter at Breaking Point is to be interpolated from meters on either side of breaking points. | cant corrosion |
| Laboratory Technician prepare | d by: | Date |
| Laboratory Supervisor Verified | by: | Date |
| Cognizant Mech/Struct Engine | er Approved by: | Date |

ENCLOSURE 4 Data Sheet 2 Tendon Wire Test Results

| INSPEC | TION PERIOD | | | | | |
|--|--|--|--------------------------------------|--|--------------------------------------|---|
| | DON WIRE ⁽¹⁾ AMPLE <u>N</u> O. | LOCATION ⁽²⁾ FROM END OF WIRE | YIELD ⁽³⁾ STRESS (ksi) | ULTIMATE STRESS (ksi) | PERCENT ⁽⁴⁾ ELONGATION | COMMENTS (IDENTIFY MOST CORRODED SECTION) |
| DOME | | | | | | |
| 1. | <u></u> | | | | | |
| 2. | | | | | | |
| 3. | | <u> </u> | <u> </u> | | | |
| VERTI | CAL | | | | | |
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| HOOP | | | | | | |
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| NOTE | S: | | | Laboratory Technician | | |
| (4) | - See Section 7 of | this analogura | | Prepared By: | | Date |
| Topical F Attachme | End starts from e this enclosure. | nd of zero length as indic | ated on Data Sheet 1 of | Laboratory Supervisor Verified By: | | Date |
| (1) (2) (3) (4) Topical Report 204 Revion 0 Attachment 8.7 Page 434 of 523 | At Ultimate Tens | fined per ASTM A421. le Strength. | | Cognizant Mech/Struct Er Approved By: | | Date |
| . Revion ge 434 c | | | | | | |
| ⊢0 of 523 | | | | 62 | | |

| | Number | | | | | | | | |
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| RB Structural Integrity To | | | | | | | | | |
| ENCLOSURE 5 | | | | | | | | | |

GREASE CAN REMOVAL/REPLACEMENT/REGREASING

DELETED

Refer to 1410-Y-83 (Reference 2.15)

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| | | Number |
|-------------------------|---|--------------|
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| | ENCLOSURE 6 | Page 1 of 16 |
| | ANCHORAGE AND CONCRETE INSPECTIONS | |

A. NORMAL ANCHORAGE AND CONCRETE INSPECTIONS

1. PURPOSE

Visual inspection/documentation for free water and of physical condition of anchorage assembly components, i.e., buttonheads, washers, bearing plates.

2. LIMITS AND PRECAUTIONS

WARNING

Each tendon wire is tensioned to nearly 8000 lb. DO NOT strike tendon end assembly with any metal object while tendon is tensioned. Avoid getting in a direct line with the tendon end while it is tensioned.

3. PROCEDURE

- 3.1 PRIOR TO LIFT-OFF TEST
 - 3.1.1 Examine interior of end cap and anchorage components for the presence of free water. Document any free water found in the Comments area on Data Sheet 4. Collect a sample of the water if present in sufficient quantity to allow this and label container to identify for later laboratory test to determine pH.
 - 3.1.2 Observe each tendon anchorage for buttonheads which are missing or which protrude. Document on Data Sheets 1, 2, 3, and 4 of this enclosure.
 - 3.1.3 Check anchorheads for any sign of cracking or serious degradation. Cracks, resulting in failure of anchorheads, have occurred at other plants. Before applying hydraulic ram the condition of each tendon anchorhead should be inspected to avoid potential personnel hazard. Notify Cognizant Mechanical/Structural Engineer immediately if degradation is noted. Be advised that this has been a problem at other plants in the past.
- 3.2 WHILE DETENSIONED, IF APPLICABLE

Inspect for buttonheads which protrude much farther than adjoining one. Make note of these on Data Sheet 4 of this enclosure to facilitate location (for reinspection after retensioning).

| | | | | | Number | | | | | | | |
|-------|---|-----------|--|---|------------------------------|--|--|--|--|--|--|--|
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| | | | | ENCLOSURE 6 | Page 2 of 16 | | | | | | | |
| | 3.3 | AFTER L | IG | | | | | | | | | |
| | | 3.3.1 | | for buttonheads which are missing or which protrude. , 2, 3, and 4 of this enclosure. | Document on the Data | | | | | | | |
| | | 3.3.2 | 3.2 Perform VT-1 inspection of buttonheads. Document active corrosion and dama | | | | | | | | | |
| | | 3.3.3 | 3.3 Document buttonhead inspection results on Data Sheets 1, 2, 3, and 4 of this e | | | | | | | | | |
| | | 3.3.4 | Perform and corr | plates. Document cracks | | | | | | | | |
| | | 3.3.5 | plate, fo | VT-1C of concrete for a distance of 2 feet extending or cracking or voids and for gaps between bearing plat comparator or feeler gages. | | | | | | | | |
| | | 3.3.6 | Document findings on Data Sheets 5, 6, or 7 of this enclosure. Use grid paper and D Sheet 9, of this enclosure as necessary to identify significant crack patterns and widt | | | | | | | | | |
| | 3.3.7 Immediately after inspection of the buttonheads, butter the end of the clean bulk filler grease completely coating all buttonheads to provide protection until the tendon is bulk filled. | | | | | | | | | | | |
| | 4. | ACCEPT | ANCE C | RITERIA | | | | | | | | |
| | | 4.1 | No evid | ence of cracking in anchor heads, shims, washers, or | bearing plates (IWL 3221.3). | | | | | | | |
| | | 4.2 | No ancl | norage assembly shims, buttonheads or washers with | active corrosion. | | | | | | | |
| | | 43 | Anchora | age assembly shims, buttonbeads or washers with evi | dence of active corrosion | | | | | | | |

4.3 Anchorage assembly shims, buttonheads or washers with evidence of active corrosion are subject to rejection and shall be further evaluated by the <u>Cognizant</u> <u>Mechanical/Structural Engineer</u>.

| | | Number | | | | | | | | |
|----------------------------|---|------------------------------------|--|--|--|--|--|--|--|--|
| Title | TMI - Unit 1 Surveillance Procedure | 1301-9.1 Revision No. | | | | | | | | |
| RB Structural Integ | ity Tendon Surveillance | 21 | | | | | | | | |
| | ENCLOSURE 6 | Page 3 of 16 | | | | | | | | |
| 4.4 | No bearing plates with active corrosion. | | | | | | | | | |
| 4.5 | Bearing plates with evidence of active corrosion are sub further evaluated by the Cognizant Mechanical/Structura | | | | | | | | | |
| 4.6 | Cracks in surrounding concrete face greater than 0.010 inch wide shall receive engineering evaluation. | | | | | | | | | |
| 4.7 | Cracks in surrounding concrete face greater than/equal repaired after appropriate engineering evaluation. Repaprocedure. | | | | | | | | | |
| 4.8 | Cracks larger than 0.020 shall be monitored in future Te | ndon Surveillances until repaired. | | | | | | | | |
| 4.9 | IF any missing, broken and/or damaged wires are detect previous inspections to determine if damage was noted Data Sheets 1, 2, and 3 under "comments" section and | previously. Record findings on | | | | | | | | |
| 4.10 | Ensure Data Sheets 1 through 10 of this enclosure are f | illed out and signed. | | | | | | | | |
| | CKS AT 9 SELECTED DOME TENDON ANCHORAGE enclosure (Periods 4, 5 6, and 7) | AREAS IDENTIFIED ON DATA | | | | | | | | |

1. PURPOSE

Inspection for concrete crack growth at Ring Girder anchorage areas. Required per Tech. Spec. 4.4.1.2.5 and also per report to NRC for 15 year Tendon Surveillance.

| | | Number |
|----------------------------|--|--------------|
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2. PROCEDURE

- 2.1 Perform VT-1C of concrete around dome tendon anchorage areas for crack growth for a distance of 2 feet extending outward from the bearing plate during 10 (Period 4), 15 (Period 5), 20 (Period 6), 25 (Period 7), and 30 (Period 8) year inspections by monitoring cracks greater than 0.005 inch in width.
- 2.2 Measure width, depth (if depth can be measured with simple existing plant instrument, i.e. feeler gauges, wires) and length of selected cracks by charting, as necessary.
- 2.3 Use Data Sheets 8 and 9 of this enclosure to document inspection results.

| | NOTE |
|----------------------------------|---|
| filed under 130 procedure has | k measurements made during the 3 years after SIT are 1-8.2, "Ring Girder Surveillance Program". (The since been cancelled and the procedure number was a different procedure). |

3. ACCEPTANCE CRITERIA

- 3.1 Data Sheets 9 and 10 of this enclosure filled out and signed.
- 3.2 Submit completed Data Sheets 9 and 10 of this enclosure to <u>Cognizant</u> <u>Mechanical/Structural Engineer</u> for evaluation. This inspection may be discontinued if the concrete cracks show no sign of growth. If, however, these inspections indicate crack growth, an investigation of the causes and safety impact shall be performed.
- 3.3 Cracks in surrounding concrete face greater than 0.010 inch wide shall receive engineering evaluation.
- 3.4 Cracks in surrounding concrete face greater than/equal to 0.050 inch wide shall be repaired after appropriate engineering evaluation. Repair per TMI-1 approved repair procedure. (1440-Y-23).

C. VISUAL INSPECTION OF CONTAINMENT

1. PURPOSE

Visual inspection of 100% of all accessible surfaces of the exterior concrete surfaces of containment, and examination of tendon end caps for grease leakage or end cap deformation except for the 1-year follow-up exam of the SGRP opening.

The 1-year follow-up exam of the SGRP opening may be limited to visual inspection of 100% of accessible surfaces of the exterior concrete of the SGRP Containment Opening Concrete Repair, and examination of tendon end caps for grease leakage or end cap deformation during the Augmented Inspection for the SGRP Containment Opening.

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ENCLOSURE 6

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NOTE

Accessible surfaces shall be interpreted as defined in ASME Section XI, Subsection IWL-1000.

2. PROCEDURE

NOTE

Areas that have suspect indications or require more sensitivity shall receive a VT-1C inspection. All potentially unacceptable indications shall have a sketch generated detailing the indication's size and location, for trending or Engineering Evaluation purposes.

- 2.1 Perform VT-3C visual examination of the exterior concrete surface of the containment including the foundation mat around the bottom vertical tendon anchorages noting results of examination on DATA SHEET 10 of this enclosure.
- 2.2 The VT-3C examination shall detect, describe, and locate evidence of conditions defined in ACI 201.1R-92 and any of the following indications of possible abnormal degradation: Large spall, severe scaling, grease leakage, other surface deterioration.
- 2.3 Visually inspect all tendon end caps for grease leakage or grease cap deformation. Removal of grease caps is not necessary for this inspection.
 - 2.3.1 If grease cap deformation is noted which is indicative of anchorage hardware deterioration then the grease cap will be removed for further inspection.

NOTE

Areas considered inaccessible, shall be evaluated when conditions exist in accessible areas that indicate the presence of, or result in degradation of inaccessible areas.

3. ACEPTANCE CRITERIA

- 3.1 Concrete surface indications meeting the surface condition attributes listed in Section 5.1 of ACI 349.3R-96, are generally acceptable without further Engineering Evaluation. Conditions non-compliant with Section 5.1 shall be submitted to Cognizant Mechanical/Structural Engineer in order to ascertain if there is evidence of damage or degradation sufficient to warrant further evaluation or repair.
- 3.2 Tendon end grease caps shall show no evidence of active grease leakage.
- 3.3 Tendon end grease caps shall show no evidence of grease cap deformation, which may be indicative of anchorage hardware deterioration.

Title

Data Sheet 1 Anchorage Assembly Surveillance Inspection Dome Tendons

| | | | | | | _ | | | | | | | | | | | | |
|---|----------------------|--------|---|----------------------|---------------------|---------------------------|-----------|----------|-------|----|----------|---------------|--------|---------------|----------|-------------------------------|------------------------------------|---------------------|
| TENDON | NDON END BUTTONHEADS | | | | ST | STRESSING WASHER & NUT | | | SHIMS | | | BEARING PLATE | | DATE INSP. | COMMENTS | INSP. BY CONTR. FOREMAN | VERIF. BY COGNIZANT QV INSP. | |
| I.D. | Location | Corr. | NO. OF MISSING, BROKEN, AND/OR DAMAGED WIRES | CORR. | | | | SKETCHED | | | SKETCHED | CORR. | CRACKS | SKETCHED | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 1 | | | | | | | | | | | | _ | | | | | | |
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| LEGEN | <u>ND</u> | | | | | | | | | | | | | | | | | |
| <u>≥GÆNEI</u> | RAL | TE | NDON END- | | | | | | | | | | | | | | | |
| 번 별오 Bpic실 분eport 204 Revion 0 Attachment 8.7 Page 441 of 523 | S) | IDE | NTIFY TEN | DON END (<u>S</u> i | HOP OR <u>F</u> IEI | _D) ANC | D NW, NE, | SW, SE | | 69 | | | | | | | | |
| 523 | | | | | | | | | | 09 | | | | | | | | |

Data Sheet 2 Anchorage Assembly Surveillance Inspection Vertical Tendons

| | | | | | | | | | | | | | | | | | INSP. BY | VERIF. BY |
|---|----------------|------------|---|-------------------------------------|---------------------|------------|-------------------|----------------|-------------|--------|----------------|-------------|-----------|----------------|---------------|----------|----------|-----------------------|
| TENDON | END | | В | UTTONHEADS | | ST | RESSING N & NU | WASHER T | | SHIMS | 6 | | BEARING I | PLATE | DATE INSP. | COMMENTS | CONTR. | COGNIZANT QV INSP. |
| | | | NO. OF MISSING, BROKEN, AND/OR | | | | ^ | / | | ^ | | | ^ | <u> </u> | | | | |
| I.D. 1 | Locatior 2 | Corr. 3 | DAMAGED WIRES 4 | CORR. 5 | SKETCHED 7 | CORR. 8 | CRACKS 9 | SKETCHED 10 | CORR. 11 | CRACKS | SKETCHED 13 | CORR. 14 | CRACKS | SKETCHED 16 | 17 | 18 | 19 | 20 |
| 1 | | | | | | | | ····· | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | _ | | | | | | |
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| 5 | | | | | | | | | | | | | | | _ | | | |
| 6 | | _ | | | | | | | | | | | | | | | | |
| 프 또 또 GB 프 또 S Top섘의 당동ort보244 Revion 0 Attachment 8.7 Page 442 of 523 | ND RAL S | | | D-LOCATION NDON END (<u>S</u> H | OP OR <u>F</u> IELI | D) AND | тор (т) с | PR BOTTOM | | TENDON | | | | | | | | |
| i23 | | | | | | | | | 1 | U | | | | | | | | |

Data Sheet 3 Anchorage Assembly Surveillance Inspection Hoop Tendons

| TENDON | END | BUTTONHEADS | | | | ST | STRESSING WASHER & NUT | | | SHIMS | | | BEARING PLATE | | | COMMENTS | INSP. BY CONTR. FOREMAN | VERIF. BY COGNIZANT QV INSP. |
|--------------------------------------|------------------------|-------------|--|------------------------------------|---------------------|------------|---------------------------|---------------|-------------|--------------|----------------|-------------|---------------|----------------|----|----------|-------------------------------|---|
| | | | NO. OF MISSING, BROKEN, AND/OR DAMAGED | | | | | | | | | | | | | | | |
| i.D. 1 | Location 2 | Corr. 3 | WIRES 4 | CORR. 5 | SKETCHED 6 | CORR. 7 | CRACKS 8 | SKETCHED 9 | CORR. 10 | CRACKS 11 | SKETCHED 12 | CORR. 13 | CRACKS 14 | SKETCHED 15 | 16 | 17 | 18 | 19 |
| 1 | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | , <u>, , , , , , , , , , , , , , , , </u> |
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| 5 | | | | | | | <u> </u> | | <u> </u> | | | | | | | | | |
| | | | | <u> </u> | | | | | | | | | | | | | | |
| 6 | | <u> </u> | | | | | | | | | | | <u> </u> | | | | | |
| 「日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日日 | <u>ND</u> RAL SS | _ | | -LOCATION NDON END (<u>S</u> H | OP OR <u>F</u> IELD |) AND 1 | IUMBER (| DF BUTTRE | SS (1 TC | | ENDON END |) | | | | | | |

ENCLOSURE 6 Data Sheet 4 **Tendon Buttonhead Inspection**

| | RB Tendon Surveillance |
|--------------------------------|---|
| | INSPECTED BY CONTRACTOR FOREMAN |
| Attachment 8.7 Page 444 of 523 | 72 |

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ENCLOSURE 6

Data Sheet 5 Tendon Anchorage Area Concrete Crack Inspection Dome Tendons

| Inspection | n Period | | <u>_</u> | · | | | | | Insp. By | Verify. By |
|---|--------------|-----------|-------------------|--------------------------|---------|----------------------------|--|----------------------|-------------------|-----------------------|
| Tendo <u>No.</u> | | Location | <u>1</u> | Remarks about Cracking | Pattern | Cracks with Location(A) | width >0.01" <u>Width (IN.)</u> (B) | Date <u>Insp.</u> | Contr. Foreman | Cognizant QV Insp. |
| 1 | | <u> </u> | | | | | | | | |
| 2 | | | | | | | | | | |
| | | <u></u> | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| NOTE: | (A) Locatio | n: | | | | | | h/Struct Engineer | - | . . |
| Topic Attac | Identify Ter | ndon End | (<u>S</u> hop or | Field) and NW, NE, SW, S | SE . | | Reviewed By: _ | | L | Date: |
| Topical Report 204 Revion 0 Attachment 8.7 Page 445 of 523 | (B) If concr | ete crack | width > 0 | 0.01", provide sketch | | | | | | |
| tevion 0 445 of 523 | | | | | | 73 | | | | |

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ENCLOSURE 6 Data Sheet 6 Tendon Anchorage Area Concrete Crack Inspection Vertical Tendons

| Inspection I | Period | | | | Inon Du | Vorify By |
|----------------------|--|--------------------------------|--|---------------|--------------------------------------|--|
| Tendon <u>No.</u> | Location | Remarks about Cracking Pattern | Cracks with width >0.01" <u>Location</u> (A) <u>Width (IN.)</u> (B) | Date Insp. | Insp. By Contr. <u>Foreman</u> | Verify. By Cognizant <u>QV Insp.</u> |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| chmen T d |) Location: entify Tendon End (<u>S</u> ho or B - Top or Bottom of) If concrete crack width | | Cognizant Mech/Struct Engineer Reviewed By: | | Date: | |
| vion 0 146 of 523 | | | 74 | | | |

Data Sheet 7 Tendon Anchorage Area Concrete Crack Inspection Hoop Tendons

| Inspection Period | | | | | | |
|------------------------------------|--|--------------------------------|--|---------------|-----------------------------------|---|
| Tendon <u>No.</u> | Location | Remarks about Cracking Pattern | Cracks with width >0.01" Location(A) <u>Width (IN.)</u> (B) | Date Insp. | Insp. By <u>Contr. Foreman</u> | Verify. By <u>Cognizant QV Insp.</u> |
| 1 | | <u></u> | | | | |
| 2 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | . <u></u> |
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| | | | | | | |
| 8 | | | | | | |
| 9. | | | | | | |
| | | | | | | |
| Attac | | | | | | |
| hmen Rent CNOTE: (A) Locatio | | | | | | |
| · 기차 Identify Ter | ndon End (<u>S</u> hop or <u>F</u> iel mber of Buttress At Enc rete crack width > 0.01" | l of Tendon | Cognizant Mech/Struct Engineer Reviewed By: | | Date: | |
| n 0 of 523 | | | 75 | | | |

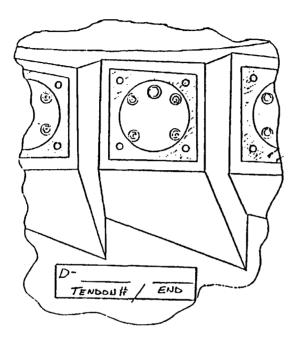
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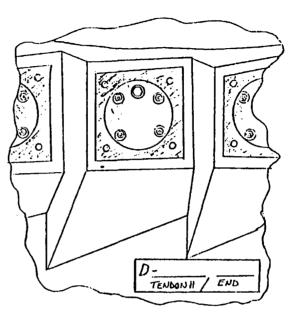
ENCLOSURE 6

Data Sheet 8 Concrete Crack Growth Inspection Dome Tendons

| Inspection | n Period | | | | | | | | | Vorify Dy |
|---|------------|---------------|--|--------------------------------|------------------------------|--|---------------|---|------------------------------------|--|
| Tendo <u>No.</u> | | Location | Remarks about Crackin | ng Pattern | Cracks with v Location(A) | width >0.01" <u>Width (IN.)</u> (B) | Date Insp. | | nsp. By Contr. <u>oreman</u> | Verify. By Cognizant <u>QV Insp.</u> |
| 1. <u>D-10</u> | <u>)3</u> | NE END | | | | | | | | |
| 2. <u>D-11</u> | 18_ | <u>SW_END</u> | • | | | | | _ | | |
| 3. <u>D-20</u> | <u>)3</u> | <u>NE END</u> | | | | | | | | |
| 4. <u>D-21</u> | 18_ | <u>SE END</u> | | | | | | | | <u> </u> |
| 5. <u>D-22</u> | 25 | NW END | | | | | | | <u> </u> | |
| 6. <u>D-24</u> | <u>19</u> | <u>SE END</u> | | v - 1. | | | | | | |
| 7. <u>D-31</u> | 13 | <u>SE END</u> | | | | | | | | |
| 8. <u>D-32</u> | 29 | <u>SW END</u> | | | | | | | | |
| 9. <u>D-33</u> | 34 | <u>NW END</u> | | | | | | | | |
| 10 | | | | | | | | _ | | |
| 11 | | | | | | | | | <u></u> | |
| 12 | | | | | · | | | _ | | |
| NOTE: | (A) Locati | ion: | | | | | | | | |
| Topical Report 204 Revion 0 Attachment 8.7 Page 448 of 523 | NW, NE, | | or <u>F</u> ield) and > 0.01", provide sketch | Cognizant Meo Reviewed By:_ | | neer | | | | |
| rion 0 48 of 523 | | | | | 76 | | | | | |

ENCLOSURE 6 DATA SHEET 9 Crack Growth Inspections





Choose the sketch which is most appropriate and plot the observed cracks.

| INSPECTED BY CONTRACTOR | DATE |
|--|------|
| VERIFIED BY COGNIZANT QV INSPECTOR | DATE |
| REVIEWED BY COGNIZANT MECH/STRUCT ENGINEER | DATE |

ENCLOSURE 6 Data Sheet 10 General Containment Inspection Results

| Mat Foundation in Tendon Gallery | |
|--|--|
| | |
| Tendon Grease Caps | |
| | |
| | |
| Buttress 1 to 2 | |
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| | ······································ |
| Buttress 2 to 3 | |
| | |
| | |
| | |
| | |
| | |
| Buttress 3 to 4 | |
| | |
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| | |
| | |
| | |
| Cognizant Mech/Struct Engineer Reviewed By: | Date: |
| Performed By: | |

ENCLOSURE 6 Data Sheet 10 General Containment Inspection Results

| Buttress 4 to 5 | |
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| | |
| | ····· |
| | |
| Buttress 5 to 6 | |
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| | |
| Buttress 6 to 1 | |
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| | |
| Dome Area | |
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| Cognizant Mech/Struct Engineer Reviewed By: | |
| Reviewed By: | Date: |

| Number | |
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ENCLOSURE 7 Additional Inspection Commitments Due to Abnormalities Previously Documented in 1301-9.1

| Inspection Period | Abnormality Noted | Commitment | Comments |
|-------------------------------|--|---|---|
| 1 5/21/75 -7/02/75 | NONE | NONE | NONE |
| 2 8/17/77 - 11/11/77 | Tendon H-51-13 had numerous cracked buttonheads. | Inspect H-51-13 buttonheads in period 3 to determine if cracking continues. | NONE |
| 3 4/17/80 - 8/6/80 | V31 Lift off 3 kips low and adjacent tendons not lifted off. V138 Category 4 Corrosion | Do lift off on V30 and V32 in period 4. Reinspect V138 in period 4 to better document the corrosion and evaluate. | LER 81-010 sub - to document incom- plete inspect. during 1980 surveillance. H-51-13 inspection showed no continued cracking. |
| 4 5/85 - 6/85 | NONE | NONE | Lift off of V30 & V32 was performed with acceptable results. The corrosion on V138 was evaluated & found acceptable. |
| 5 10/89 - 1/90 | Some cracks appeared to have grown slightly from previous. | During period 6 repeat the concrete cracks inspection as required in Enclosure 6. | NONE |
| 6 9/94 - 11/94 and 9/95 | As captured in SDR's 1 through 6 | None | All SDR's accept condition(s) found with no further action required |
| 7* | Grout overlay repairs not completely sound (T.R. 136, Sec. 4.3) | Consider performing repairs | 30 Year Exam |
| | SE quad above ring girder - Grout cover coming off & Underlying rebar exposed (T. R. 136, Sec. 4.2) | Reexamine rebar and/or consider grout repair | 30 Year Exam |
| 7* | Construction joint above ring girder between D32ONE & D321NE - Crack @ .018" wide (T.R. 136, Sec. 4.5) | reexamine crack & ensure stable | 30 Year Exam |

* Reference Topical Report (T.R.) No. 136, Tendon Surveillance 25th Year (Period 7) for details surrounding the abnormalities noted and commitments made to the regulator in that Topical Report for Period 7.

Title

| | | TMI - Unit 1 Surveillance Procedure | 1301-9.1 |
|---------------------|---|--|--------------|
| | | | Revision No. |
| Structura | I Integrity Tendon Surveill | ance | 21 |
| | | ENCLOSURE 7 | Page 2 of 3 |
| nspection Period | Abnormality Noted | Commitment | Comments |
| /* (Cont'd) | Crack @ H46-37 @ .013" wide w/in 2' of base plate edge (T.R. 136, Sec. 4.7) | reexamine crack & ensure stable | 30 Year Exam |
| | Some grease samples exhibit Reserve Alkalinity No. < .5 | Ensure grease samples w/ <.5 retested per Unmodified Version ASTM D974 Sec. 9 for acid number | 30 Year Exam |
| <u> </u> | V164 field end w/ nitrates @ 10.3 ppm (T.R. 136, Sec. 4.8) | Reexam of 2 nd sample found SAT. Resample V164 field end to ensure nitrates stable. | 30 Year Exam |
| | V86 - assurance of complete Tendon void grease fill not satisfied (T. R. 136, Sec 4.9) | resample grease @ field end V86 & top off with grease. | 30 Year Exam |
| | Some areas found spalled during IWL exam (T.R. 136, Sec. 4.4) | Reexam spalled areas - ensure stable and/or grout repair | 30 Year Exam |
| | Cracks found over FHB Roof between buttresses 3 & 4 (T.R. 136, Sec. 4.1) | Perform VT-1C exam & ensure stable w/ no active degradation Mechanism | 30 Year Exam |
| 8** 2004 | Repairs required for grout, concrete cracks, exposed reinforcing steel, vertical tendon upper end bearing plate corrosion as listed in TR-183, Section 5.1 | VT-1/VT-1C exams of all repairs listed in TR-183, Section 5.1 | 35 Year Exam |
| | Overall concrete surface degraded conditions as listed in TR-183, Section 4.1, 4.2 | Re-examine VT-1/VT-1C of all areas previously identified for detailed examination, but not repaired. | 35 Year Exam |
| | D-342 tendon exams limited by location over Main steam Safety Valve Discharge piping | Do full set of tests and examinations, during 2009 Refueling Outage, for D-342 | 35 Year Exam |

* Reference Topical Report (T.R.) No. 136, Tendon Surveillance 25th Year (Period 7) for details surrounding the abnormalities noted and commitments made to the regulator in that Topical Report for Period 7.

** Reference Topical Report (T.R.) No. 183, Tendon Surveillance 30th Year (Period 8) for details surrounding the abnormalities noted and commitments made to the regulator in that report.

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TMI - Unit 1 Surveillance Procedure

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RB Structural Integrity Tendon Surveillance

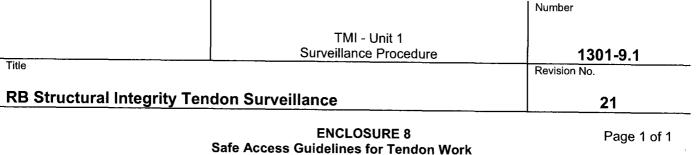
Title

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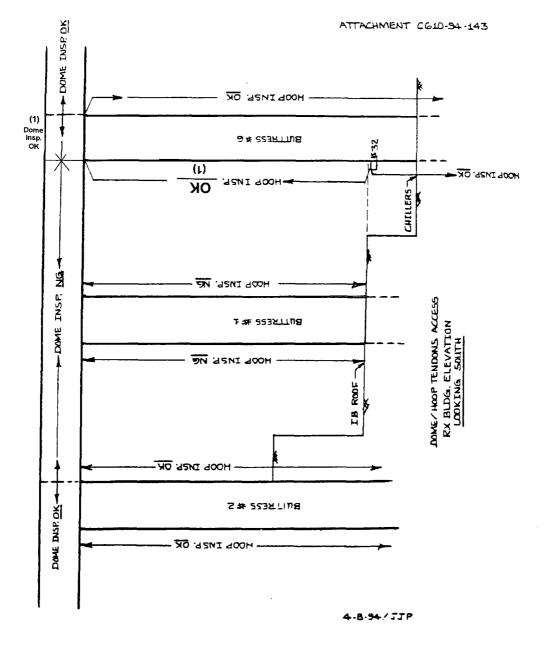
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| | | ENCLOSURE 7 | Page 3 of 3 |
|----------------------|--|---|----------------------------|
| Inspection Period | Abnormality Noted | Commitment | Comments |
| 9*** | Containment Opening Repair | The surface of new concrete placed in the steam generator opening will be VT-1C examined at the new concrete perimeter and corners for evidence of shrinkage cracks / separation. | 1 Year SGRP Follow-up Exam |
| 9*** | Containment Opening Repair | The tendon gallery will be examined for evidence of CPM leakage and the effects of ground water seepage. | 1 Year SGRP Follow-up Exam |
| 9*** | Incomplete pump through of CPM in V157 | Verify CPM level and add as necessary to V157 | 1 Year SGRP Follow-up Exam |
| 9*** | Grout overlay of SE quad above ring girder, no deterioration noted | Perform VT-1C exam & ensure stable w/ no active degradation Mechanism | 40 th Year Exam |
| 9*** | CPM leakage in Tendon Gallery Ceiling Area | Perform VT-1C exam of The tendon gallery ceiling area including base mat concrete, tendon bearing plates and tendon end caps for evidence of CPM leakage, effects ground water seepage on concrete and steel items, deterioration of previously documented exposed reinforcing and, other damage / deterioration. | 40 th Year Exam |
| 9*** | CPM seepage through vertical cracks on lower wall above base mat. | Perform VT-1C exam of the lower wall above the base mat to determine whether or not corrosion protection medium seepage through the vertical cracks is increasing as evidenced by CPM accumulation on the top of the base mat. | 40 th Year Exam |
| g*** | Light, inactive rust noted on V184 bearing plate | Perform VT-1 exam of V84 lower end bearing plate including all surface area visible without de-tensioning of the tendon and removal of shims. | 40 th Year Exam |

***Reference Topical Report (T.R.) No. 203, Tendon Surveillance 35th Year (Period 9) for details surrounding the abnormalities noted and commitments made to the regulator in that report.



cess Guidelines for Tendon W During Power Operations



NOTE (1) Additional review with Industrial Safety in 2009 expanded the acceptable work zone at power to include these buttress 6 areas.

| Number | |
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TMI - Unit 1 Surveillance Procedure

1301-9.1 Revision No.

RB Structural Integrity Tendon Surveillance

Title

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ENCLOSURE 9 Master List of SGRP Affected Tendons and Surveillance Scope

Table 1List and Description of SGRP AffectedTendons and Corresponding Inspection Periods

| | | HOOP T | | | | | <u></u> | |
|--------|--|----------|--------|----------|----|----|----------|------------------------|
| Tendon | SGRP Impact | | pectio | | | · | 1 | Comments |
| | • | 1 Year | 10 | 11 | 12 | 13 | | |
| 46-42 | Retensioned | | | | | | | |
| 46-41 | Retensioned | X | | | | | | |
| 46-40 | Retensioned | | | | | | | |
| 46-39 | Replaced | X | | | | | | |
| 46-38 | Replaced | | | | | | | |
| 46-37 | Replaced | | | | | | | |
| 46-36 | Replaced | | | - | | | | |
| 46-35 | Replaced | | | | | | | |
| 46-34 | Replaced | | | | | | | |
| 46-33 | Replaced | | | | | | | |
| 46-32 | Replaced | | | | | | | |
| 46-31 | Replaced | | | | | | | |
| 46-30 | Replaced | | | | | | | |
| 46-29 | Retensioned | | | | | | 1 | |
| 46-28 | Retensioned | | | | | | | |
| 51-42 | Retensioned | | | | | | | |
| 51-41 | Retensioned | | | | | | | |
| 51-40 | Retensioned | | | | | | | |
| 51-39 | Replaced | | | | | | | |
| 51-38 | Replaced | | | | | | | |
| 51-37 | Replaced | | | | | | | |
| 51-36 | Replaced | | | | | | | |
| 51-35 | Replaced | | | | | | | |
| 51-34 | Replaced | | | | | | | |
| 51-33 | Replaced | | | | | | | |
| 51-32 | Replaced | | | | | | 1 | |
| 51-31 | Replaced | | 1 | | | | <u> </u> | |
| 51-30 | Replaced | | | 1 | | | <u> </u> | |
| 51-29 | Replaced | <u> </u> | | | | | 1 | ····· |
| 51-28 | Replaced | | - | T | | | 1 | ····· |
| | Total | 2 | | | | | X | = Lift-off |
| | —————————————————————————————————————— | | 1 | | | | X | = Lift-off & Wire Test |

| | | | | | | l - Unit | | | | |
|----------|--------------|-------------|-------|-------------------------|-----------------------------|--|----------------|---|----|--|
| | | | | Su | rveillar | nce Pro | cedure | · | | 1301-9.1 |
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| | | Ter | List | er List of S and Sur | veillar le 1 (C ption | Affecte nce Sc Cont'd) of SGF | ope RP Affe | cted | ds | Page 2 of 4 |
| Γ | , | | | Vertic | al Ten | Idons | | | | |
| | | | | | | tion Pe | riod | | | |
| | Tendon | SGRP Imp | act | 1 Year | 10 | 11 | 12 | 13 | | Comments |
| | V113 | Retensior | ned | | | | | <u> </u> | | |
| | V114 | Retensior | | | | - | | | | · · · · · · · · · · · · · · · · · · · |
| | V115 | Retensior | | | 1 | | | <u> </u> | | |
| | V116 | Retensior | ned | | | | | | | |
| | V117 | Retensior | ned | | | | | | | |
| | V118 | Retensior | ned | X | | | | | | |
| | V119 | Retensior | ied | | | | | r | | |
| | V120 | Retensior | ned | 1 | 1 | | | | | |
| | V121 | Retensior | ned | | | | | | | |
| | V122 | Retension | ned | <u> </u> | 1 | | | | | |
| | V123 | Retension | | +- <u>-</u> | | | | | | |
| | V124 | Retension | · | | <u> </u> | | | 1 | | |
| | V125 | Retensior | | | | | 1 | 1 | | |
| | V126 | Retension | | 1 | | | | | | |
| | V127 | Retension | | | | | | | | · · · · · · · · · · · · · · · · · · · |
| | V128 | Retension | | | 1 | l | <u> </u> | | | |
| - | V129 | Retension | | <u> </u> | | | | | | |
| - | V130 | Retension | | | | | | | | |
| - | V131 | Replace | | | | - | | | | |
| | V132 | Replace | | | <u>†</u> | | | <u> </u> | | |
| F | V133 | Replace | | | | | | | · | |
| - | V134 | Replace | | X | | <u> </u> | | <u> </u> | | |
| | V135 | Replace | | | | | | | | |
| - F | V136 | Replace | | <u> </u> | | | | | · | |
| ⊢ | V137 | Replace | | <u> </u> | | | | <u> </u> | | · |
| F | V138 | Replace | | <u> </u> | + | | | <u> </u> | | |
| - | V139 | Replace | | · | 1 | | | | | |
| ⊢ | V140 | Replace | | <u></u> <u></u> | | | | <u> </u> | | |
| | V141 | Retension | | | | ŀ | | | | |
| F | V141 | Retension | | | 1 | | | <u> </u> | | ······································ |
| F | V143 | Retension | | | | | <u> </u> | | | |
| \vdash | V145 | Retension | | | <u>+</u> | | <u> </u> | <u> </u> | | ······ |
| - | V144 | Retension | | | | | | <u> </u> | | ···· |
| ⊢ | V145 | Retension | | <u> </u> | <u> </u> | | | | | |
| ⊢ | V140 | Retension | | <u> </u> | | | | <u> </u> | | |
| ⊢ | V147 | Retension | | | + | | | <u> </u> | | |
| ⊢ | V140 | Retension | | | | | <u> </u> | | | |
| - | V149 V150 | Retension | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | | |
| · - | V150 | Retension | | | | | | | | |
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| B Structural | Integrity Tendo | n Surveill | lance | | | | | 21 |
| | Μ | laster List o and S | Survei | P Affe | ected Scop | | lons | Page 3 of 4 |
| | | T ist and Des ons and Cor | | on of S | SGRP | | | riods |
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| V152 | Tendo SGRP Impact Retensioned | ist and Des ns and Cor Vertion Ins | criptio respo cal Te pectio | on of S nding ndons n Peri | SGRP Inspe s | ectior | | |
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| V152 V153 V154 V155 | Tendo SGRP Impact Retensioned Retensioned Retensioned Retensioned | ist and Des ns and Cor Vertion Ins | criptio respo cal Te pectio | on of S nding ndons n Peri | SGRP Inspe s | ectior | | |
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DETAILED, GENERAL, VT-1, VT-1C, VT-3 AND VT-3C VISUAL EXAMINATION OF ASME CLASS MC AND CC CONTAINMENT SURFACES AND COMPONENTS

1. **PURPOSE**

- 1.1. This procedure provides the requirements and examiner responsibilities for performing Inservice Inspection (ISI) or Repair Replacement Detailed, General, VT-1, VT-1C, VT-3 and VT-3C Visual Examination on containment surfaces and components, in accordance with Subsections IWE (Class MC) and IWL (Class CC) of the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code (ASME B&PV Code) Section XI, 1992 Edition, 1992 Addenda through 2001 Edition, 2003 Addenda including December 2003 Erratum as modified by Title 10, Code of Federal Regulations (10CFR) 50.55a Paragraphs (b)(2)(viii) and (b)(2)(ix).
- 1.2. This procedure is also applicable for Stations having authorized or granted Code Relief Requests for the use of portions of this procedure, as applicable.
- 1.3. The definitions of discontinuities in concrete, coating failures, and post tensioning systems (tendons) indications are provided in Attachments 1, 2, and 3.

2. MATERIALS AND SPECIAL EQUIPMENT

- A near distance vision test chart (Test Card or Illumination Card) in accordance with Table IWA-2210-1, if applicable;
- Calibrated Illumination Light Meter with measurement display capability in foot-candles or lux, if applicable;
 - 1 foot-candle = 10.76391 lux.
 - 1 lux = 0.09290304 foot-candle.
- Mirrors, Binoculars, Telescopes, Borescopes, Closed Circuit Televisions, Cameras, etc., if applicable;
- Flashlight or droplights, if applicable.
- 2.1. Borescopes, mirrors, telescopes, closed circuit television, cameras or other devices may be used for remote examination, provided such devices or systems have a resolution capability at least equivalent to that attainable by direct visual examination.
- 2.2. Magnifying glasses, mirrors, depth gages, crack comparators, surface replication techniques and weld gages may be used to supplement direct examination.
- 2.3. Measuring and Test Equipment (M&TE) or visual aids used shall be recorded on the Work Order (WO) and/or on the applicable Visual Examination NDE Report, (Attachments 4, 5, or 6) or equivalent.

3. PRECAUTIONS, LIMITATIONS, AND PREREQUISITES

3.1. Precautions

- 3.1.1. Personnel performing examinations shall **ENSURE** that all Site Safety and Radiological Protection Standards are observed.
- 3.2. Limitations
- 3.2.1. **ENSURE** that this procedure meets the appropriate code requirements for the scope of examinations to be performed.
- 3.2.2. **ENSURE** that the requirements and criteria contained in authorized or granted site specific Code Relief Requests are met.
- 3.3. <u>Prerequisites</u>
- 3.3.1. Personnel performing Examinations shall be a minimum Level I qualified and certified in accordance with ER-AA-335-001 '*Qualification and Certification of Nondestructive Examination (NDE) Personnel*' or in accordance with an approved vendor qualification and certification procedure.
 - Certified Level I Personnel shall <u>not</u> independently EVALUATE or INTERPRET the results of an examination. If any conditions exist as listed in the Acceptance Standards/Criteria stated in Paragraphs 4.6. through 4.9, a Certified Level II or III <u>shall</u> be contacted to conduct an evaluation or interpretation of the examination results
 - 2. Certified Level I Personnel **shall** be qualified to conduct the following:
 - A. **PERFORM** specific equipment set-ups;
 - B. **PERFORM** specific calibrations and examination;
 - C. **RECORD** data / results to specific written instructions;
 - D. **IMPLEMENT** written and verbal instructions under the guidance of a certified Level II or Level III Examiner.
 - 3. Personnel **shall** be certified to a Level II or Level III Examiner to perform review/evaluation of recordable, reportable or unacceptable results from an examination.
 - 4. Additionally, an Engineer **may** perform Detailed or General Visual Examinations.
 - A. A Responsible Engineer (RE) with a <u>current</u> Engineering Qualification Card on ASME Class CC (IWL) **may** perform Detailed or General Visual Examinations on IWL containment surfaces and post tensioning systems (tendons).

- B. A Responsible Individual (RI) with a <u>current</u> Engineering Qualification Card on ASME Class MC (IWE) and Class CC (IWL) **may** perform Detailed or General Visual Examinations on Class MC and metallic liners of Class CC components.
- 3.3.2. Procedure Demonstration/Qualification
 - 1. A written procedure and report of examination results is required.
 - 2. For procedure demonstration, a near-distance vision test chart containing text with lower case characters without an ascender or descender (e.g., a, c, e, o) in accordance with ASME Section XI, Table IWA-2210-1 is required.
 - 3. Measurements of the near-distance test chart shall be made once before initial use with an optical comparator (10X or greater) or other suitable instrument to verify that the height of a representative lower case character, for the selected type size, meets the requirements of Table IWA-2210-1.
 - 4. The remote examination procedure shall be demonstrated to resolve the required test chart characters.
- 3.3.3. Detailed and General Visual Verification of Resolution and Illumination

Examinations shall be performed either directly or remotely with adequate resolution and illumination. Personnel **shall** have visual acuity sufficient to detect evidence of degradation, by line of sight from available viewing angles from floors, platforms, walkways, ladders or other permanent vantage points, unless temporary access is required by the inspection plan.

- 1. Detailed Visual Examinations (conducted by a Certified VT-1 or VT-1C Examiner or Engineer, as applicable) shall be sufficient to determine the magnitude and extent of any deterioration and distress of the surface/component being examined and on suspect surfaces initially detected by General Visual Examination or structural condition of areas affected by repair/replacement activities.
- 2. General Visual Examinations (conducted by a Certified VT-3 or VT-3C Examiner or Engineer, as applicable) shall be sufficient to assess the general condition of the surface or component and to identify areas of deterioration and distress on the surface or component being examined.
- 3.3.4. VT-1/1C and VT-3/3C Verification of Resolution and Illumination

- NOTE: As an alternative to the Light Meter Illumination Measurement as described in Paragraph 3.3.4.1 and Sub-Paragraphs, a test chart (Test Card or Illumination Card) in accordance with the requirements of IWA-2210 **shall** be used to determine adequacy of resolution and illumination on the component at the examination site. Ability to discern the lower-case characters on the Test Card or Illumination Card at a maximum distance of 2 feet (609.6 mm) for VT-1 or VT-1C and 4 feet (1219 mm) for VT-3 or VT-3C is a measure of adequate resolution and lighting. This alternative is provided in Engineering Change (EC) 0000365662-000 of 04/27/2007, which documents the approval of the alternative examination technique demonstration for the use of a character card as equivalent for determining adequate lighting per IWA-2210 as required by ASME B&PV Code Section XI Paragraph IWA-2240, 1992 Edition 1992 Addenda through 1995 Edition 1997 Addenda.
- When performing examinations to <u>Section XI, 1992 Edition with 1992</u> <u>Addenda through 1995 Edition 1997 Addenda</u>, a test chart (Test Card) in accordance with the requirements of IWA-2210 may be used to determine adequacy of resolution on the component at the examination site. Additionally, illumination <u>shall</u> be measured in foot-candles on the component at the examination site with a calibrated instrument evidencing the minimum illumination required. Ability to discern the lower-case characters on the Test Card at the minimum illumination level is a measure of adequate resolution and lighting.
 - When performing direct VT-1 or VT-1C examinations, a minimum illumination of 50 foot-candles (fc) at a maximum distance of 2 feet (609.6 mm) shall be maintained. Calibrated light meters <u>shall</u> be used for verification of illumination levels.
 - B. When performing direct VT-3 or VT-3C examinations, a minimum illumination of 50 foot-candles (fc) at a maximum distance of 4 feet (1219 mm) shall be maintained. Calibrated light meters <u>shall</u> be used for verification of illumination levels.
 - C. When performing examinations, a calibrated light meter in accordance with the requirements of IWA-2210 shall be used to determine adequacy of illumination on the component at the examination site.
 - D. The qualification shall be demonstrated using a near distance vision test chart containing text with lower case characters without an ascender or descender (e.g., a, c, e, o) with maximum lower case height for VT-1/1C of 0.044 inches (1.1 mm) and for VT-3/3C of 0.105 inches (2.7 mm).
 - E. When performing remote VT-1/1C or VT-3/3C visual examinations required by ASME Section XI, Subsection IWE and IWL, the Topical Report 204 Revion 0 Attachment 8.7 Page 462 of 523

illumination levels may be reduced and the distances may be extended as specified in Paragraphs 3.3.4.1.A. and 3.3.4.1.B, provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination and that the system is capable of distinguishing and differentiating between colors applicable to the component.

- F. **If** required by the applicable governing code edition and addenda, the adequacy of the illumination levels from battery powered portable lights shall be checked before and after each examination or series of examinations, not to exceed 4 hr between checks.
- 2. When performing examinations to <u>Section XI, 1998 Edition and later</u>, a test chart (Test Card or Illumination Card) in accordance with the requirements of IWA-2210 **shall** be used to determine adequacy of resolution and illumination on the component at the examination site. Ability to discern the lower-case characters on the Test Card or Illumination Card is a measure of adequate resolution and lighting.
 - When performing direct VT-1 or VT-1C examinations, a minimum illumination of 50 foot-candles (fc) at a maximum distance of 2 feet (609.6 mm) shall be maintained. Calibrated light meters <u>or</u> a near distance resolution card (Test Card or Illumination Card) per paragraph 3.3.4.2.C. <u>shall</u> be used for verification of illumination levels.
 - B. When performing direct VT-3 or VT-3C examinations, a minimum illumination of 50 foot-candles (fc) at a maximum distance of 4 feet (1219 mm) shall be maintained. Calibrated light meters <u>or</u> a near distance resolution card (Test Card or Illumination Card) per paragraph 3.3.4.2.C <u>shall</u> be used for verification of illumination levels.
 - C. When performing examinations, a test chart (Test Card or Illumination Card) in accordance with the requirements of IWA-2210 shall be used to determine adequacy of resolution and illumination on the component at the examination site.
 - D. The qualification shall be demonstrated using a near distance vision test chart containing text with lower case characters without an ascender or descender (e.g., a, c, e, o) with maximum lower case height for VT-1/1C of 0.044 inches (1.1 mm) and for VT-3/3C of 0.105 inches (2.7 mm).
 - E. When performing remote VT-1/1C or VT-3/3C visual examinations required by ASME Section XI, Subsection IWE and IWL, the illumination levels may be reduced and the distances may be extended as specified in Paragraphs 3.3.4.2.A and 3.3.4.2.B, provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination and that the

system is capable of distinguishing and differentiating between colors applicable to the component.

- F. If required by the applicable governing code edition and addenda, the adequacy of the illumination levels from battery powered portable lights shall be checked before and after each examination or series of examinations, not to exceed 4 hr between checks. In lieu of using a light meter, these checks may be made by verifying that the illumination is adequate (i.e., no discernable degradation in the visual examination resolution of the procedure demonstration test chart characters).
- 3.3.5. A Responsible Engineer (RE) shall be a knowledgeable and qualified individual appointed by management. The RE shall be a Registered Professional Engineer with knowledge of the design, construction codes and experience in evaluating inservice conditions of structural concrete. The RE shall be responsible for:
 - Development of plans and procedures for examination of ASME Class CC (IWL) containment surfaces and post tensioning systems (tendons);
 - Approval, instruction and training of concrete examination personnel;
 - Evaluation of examination results;
 - Preparation or review of repair/replacement plans and procedures;
 - Review of procedures for pressure tests following repair/replacements;
 - Submittal of reports to the Owner documenting results of examinations, pressure tests and repairs.
- 3.3.6. A Responsible Individual (RI) shall be a knowledgeable and qualified individual appointed by management. The RI shall be knowledgeable in the requirements for design, inservice inspection and testing of Class MC (IWE) and metallic liners of Class CC (IWL) components. The RI shall be responsible for:
 - Development of plans and procedures for examination of ASME Class MC (IWE) containment surfaces;
 - Instruction, training and approval of visual examination personnel;
 - Performance or direction of general and detailed visual examinations;
 - Evaluation of examination results;
 - Submittal of report to the Owner documenting results of examinations.
- 3.3.7. **VERIFY** that the owner defined/site specific acceptance criteria/standards for IWE and IWL components have been established prior to the conduct of examination.

4. MAIN BODY

- 4.1. <u>Surface Preparation</u>
- 4.1.1. If necessary, **REMOVE** dirt, grease, or other foreign matter that would mask indications or interfere with the examination.

- 4.1.2. When a containment vessel or liner is painted or coated to protect surfaces from corrosion, **PERFORM** preservice and inservice visual examinations without the removal of the paint or coating.
- 4.1.3. When removal of paint or coating is required, **REMOVE** it in a manner that will <u>not</u> reduce the base metal or weld thickness below the design thickness. Reapplied paint and coating systems shall be compatible with the existing system.
- 4.2. <u>Illumination</u>
- 4.2.1. Use same technique to verify illumination as described in Paragraphs 3.3.3 and 3.3.4.
- 4.2.2. It is <u>not</u> necessary to measure illumination level on each examination surface when the same portable light source or similar installed lighting equipment is demonstrated and documented to provide the specified illumination at the maximum examination distance. Battery powered portable lights may be used provided that they meet the maximum distance and minimum illumination level.
- 4.3. Examination
- 4.3.1. **PERFORM** Visual Examination by direct or remote visual examination method or a combination thereof.
- 4.3.2, **USE** mirrors or other optical aids to improve the angle of vision.
- 4.3.3. DETAILED VISUAL (DV) EXAMINATION

DV Examinations (conducted by a Certified VT-1 or VT-1C Examiner or Engineer, as applicable) are conducted to determine the magnitude and extent of any deterioration and distress of the surface/component being examined and on suspect surfaces initially detected by General Visual Examination or structural condition of areas affected by repair/replacement activities.

- 4.3.4. GENERAL VISUAL (GV) EXAMINATION
 - 1. In accordance with ASME Section XI, prior to 1998 Edition;

GV Examinations (performed by a Certified VT-3 or VT-3C Examiner) shall be performed by, or under the direction of, a Registered Professional Engineer or other individual (Certified VT-3 or VT-3C Examiner) knowledgeable in the requirements for design, inservice inspection, and testing of Class MC and metallic liners of Class CC components.

The examination shall be performed either directly or remotely, by an examiner with visual acuity sufficient to detect evidence of degradation that may affect either the containment structural integrity or leak tightness.

2. In accordance with ASME Section XI, 1998 Edition and later;

- A. IWE GV Examinations (conducted by a Certified VT-3 Examiner or Engineer, as applicable) are conducted to access the general condition of containment surfaces.
- B. IWL GV Examinations (conducted by a Certified VT-3 or VT-3C Examiner or Engineer, as applicable) are conducted to access the general structural condition of concrete containment surfaces and identify areas of concrete deterioration and distress, such as described in ACI 201.1 R-68 and ACI 349.3R.

4.3.5. VT-1, VISUAL EXAMINATION

VT-1 examinations are conducted to detect discontinuities and imperfections on the surfaces of metallic surfaces, components, supports, and tendon anchorage hardware including such conditions as cracks, wear, corrosion, or erosion and on suspect areas initially detected by VT-3.

4.3.6. VT-3, VISUAL EXAMINATION

VT-3 examinations are conducted to determine the general mechanical and structural condition of metallic surfaces, components, and their supports, by verifying parameters such as clearances, settings, and physical displacements; and to detect discontinuities and imperfections, such as loss of integrity at bolted or welded connections, loose or missing parts, debris, corrosion, wear, or erosion.

4.3.7. VT-1C, VISUAL EXAMINATION

VT-1C examinations are conducted to determine concrete deterioration and distress for suspect areas detected by VT-3C and to determine the condition of concrete extending 2.0 feet beyond the edge of tendon anchorage hardware bearing plates.

4.3.8. VT-3C VISUAL EXAMINATION

VT-3C examinations are conducted to determine the general structural condition of concrete surfaces of containments by identifying areas of concrete deterioration and distress, such as defined in the American Concrete Institute Specifications ACI 201.1 R-68 and ACI 349.3 R.

- 1. **<u>RECORDABLE INDICATION</u>**: any visually observed abnormal conditions that may potentially impact the integrity of the component design function.
- 2. **<u>SUSPECT AREA</u>**: an area with a relevant condition that has exceeded the owner defined pre-established acceptance criteria/standards.
- 3. These conditions are identified as "Recordable Indication Type Codes" in Attachments 4, 5, and 6.
- 4.4. <u>Direct Examination</u>

- 4.4.1. **CONDUCT** a direct (near distance) Detailed or General Visual Examination when personnel have visual acuity sufficient to detect evidence of degradation, by line of sight from available viewing angles from floors, platforms, walkways, ladders or other permanent vantage points, unless temporary access is required by the inspection plan.
- 4.4.2. **CONDUCT** a direct (near distance) VT-1 or VT-1C Visual Examination using a near distance vision test chart (Test Card or Illumination Card) containing text with lower case characters without an ascender or descender (e.g. a,c,e,o) with maximum lower case height of 0.044 inches (1.1 mm) at a maximum distance of 2 feet (609.6 mm) and a minimum illumination of 50 fc.
- 4.4.3. **CONDUCT** a direct (near distance) VT-3 or VT-3C Visual Examination using a near distance vision test chart (Test Card or Illumination Card) containing text with lower case characters without an ascender or descender (e.g. a,c,e,o) with maximum lower case height of 0.105 inches (2.7 mm) at a maximum distance of 4 feet (1219 mm) and a minimum illumination of 50 fc.
- 4.4.4. Verification of resolution and illumination **shall** be as qualified in Paragraphs 3.3.3 or 3.3.4.
- 4.5. <u>Remote Examination</u>
- 4.5.1. Detailed or General Visual remote examination may be substituted for direct as described in Paragraph 3.3.3.
- 4.5.2. VT-1/1C or VT-3/3C remote examinations may be substituted for direct examinations as described in Paragraph 3.3.4 provided the remote technique being used has been qualified by use of a Near-Distance Vision Chart (Test Card or Illumination Card) for the maximum distance being viewed and that the system is capable of distinguishing and differentiating between colors applicable to the component.
- 4.6. Examination of Class MC Components
- 4.6.1. Examination Boundary
 - In accordance with ASME Section XI, 1992 Edition with 1992 Addenda and prior to 1998 Edition, the examination boundary for components shall INCLUDE either the ACCESSIBLE INTERIOR and the EXTERIOR surface areas including welds and base metal.
 - 2. In accordance with ASME Section XI, 1998 Edition and later, the examination boundary for components shall **INCLUDE** all ACCESSIBLE INTERIOR and EXTERIOR surface areas including welds and base metal.
- 4.6.2. Standards for Examination Category E-A, Containment Surfaces in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. Visual Examination General

In accordance with 10CFR50.55a(b)(2)(ix)(E), at least once each Inspection Period, **PERFORM** the General Visual Examination (performed by a Certified VT-3 Examiner) by or under the direction of a Registered Professional Engineer or other individual (Certified VT-3 Examiner) knowledgeable in the requirements for design, inservice inspection and testing of Class MC and metallic liners of Class CC components.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** conditions that may affect containment structural integrity or leak-tightness (i.e., have exceeded Acceptance Standards) by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- 2. VT-3, Visual Examination on Coated Areas

EXAMINE the area to be inspected, when painted or coated, for evidence of flaking, blistering, peeling, discoloration, and other signs of distress.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 3. VT-3, Visual Examination on Non-coated Areas

EXAMINE the area to be inspected for evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.

- 4.6.3. Standards for Examination Category E-A, Containment Surfaces in accordance with ASME Section XI, 1998 Edition and later;
 - 1. Visual Examination of Accessible Surface Areas

PERFORM a General Visual Examination (conducted by a Certified VT-3 Examiner or Engineer, as applicable) to access the general condition of all Coated and Noncoated Accessible Containment Surface Areas. These areas shall include all accessible interior and exterior surfaces of Class MC components, parts, and appurtenances, and metallic shell and penetration liners of Class CC components.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** conditions that may affect containment surface integrity (i.e., have exceeded Acceptance Standards) by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- 2. Visual Examination of Pressure-Retaining Bolted Connections

PERFORM a VT-3 Visual Examination (as modified by 10CFR50.55a(b)(2)(ix)(G) and (H)) of Item E1.11 (*Pressure-Retaining Bolted Connections, Coated and Noncoated*), once each interval. Additionally, **PERFORM** a VT-3 Visual Examination on containment bolted connections that are disassembled during the scheduled performance of the examinations of Item E1.11 or whenever containment bolted connections are disassembled for any reason.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. For any flaws or degradation identified, **PERFORM** a VT-1 Visual Examination (as modified by 10CFR50.55a(b)(2)(ix)(H)).
- D. **CORRECT** conditions that cause bolted connections to violate either containment leak-tight or structural integrity by repair/replacement in accordance with IWE-3122.2.
- E. **CORRECT** loose bolting by corrective measures to the extent necessary to meet the acceptance standards identified in IWE-3122.2.
- 3. Visual Examination of Wetted Surfaces of Submerged Areas

PERFORM a VT-3 Visual Examination (as modified by

10CFR50.55a(b)(2)(ix)(G)) of Item E1.12 (Wetted Surfaces of Submerged Areas, Coated and Noncoated). These areas shall include all accessible interior and exterior surfaces of Class MC components, parts, and appurtenances, and metallic shell and penetration liners of Class CC components.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 4. Visual Examination of BWR Vent System Accessible Surface Areas

PERFORM a VT-3 Visual Examination (as modified by 10CFR50.55a(b)(2)(ix)(G)) of Item E1.20 (*BWR Vent System Accessible Surface Areas, Coated and Noncoated*). These areas shall include all accessible interior and exterior surfaces of Class MC components, parts, and appurtenances, and metallic shell and penetration liners of Class CC components and flow channeling devices within containment vessels.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 5. Visual Examination of Moisture Barriers

PERFORM a General Visual Examination (conducted by a Certified VT-3 Examiner or Engineer, as applicable) to access the general condition of all accessible Moisture Barriers, Coated and Noncoated. The examination shall include moisture barrier materials intended to prevent intrusion of moisture against inaccessible areas of the pressure retaining metal containment shell or liner at concrete-to-metal interfaces and at metal-to-metal interfaces, which are not seal-welded. Containment moisture barrier materials include caulking, flashing, and other sealants used for this application.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **CORRECT** conditions that may violate containment leak-tight integrity (intrusion of moisture against inaccessible areas of the pressure retaining surfaces of the metal containment shell or liner) by corrective measures in accordance with IWE-3122.2.
- 4.6.4. Standards for Examination Category E-B, Pressure Retaining Welds in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. VT-1 Visual Examinations on Coated Areas

EXAMINE the area to be inspected, when painted or coated, for evidence of flaking, glistering, peeling, discoloration, and other signs of distress.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, **or REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 2. VT-1, Visual Examination on Non-coated Areas

EXAMINE the area to be inspected for evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 4.6.5. Standards for Examination Category E-C, Containment Surfaces Requiring Augmented Examination in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. VT-1, Visual Examination on Coated Areas

EXAMINE the area to be inspected, when painted or coated, for evidence of flaking, blistering, peeling, discoloration, and other signs of distress.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 2. VT-1, Visual Examination on Non-coated Areas

EXAMINE the area to be inspected for evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 4.6.6. Standards for Examination Category E-C, Containment Surfaces Requiring Augmented Examination in accordance with ASME Section XI, 1998 Edition and later;
 - 1. Visual Examination of Coated Visible Surfaces

PERFORM a VT-1 Visual Examination (as modified by 10CFR50.55a(b)(2)(ix)(G)) of Item E4.11 *(Coated Visible Surfaces)* requiring augmented examination as those identified in IWE-1240 for evidence of flaking, blistering, peeling, discoloration and other signs of distress. Additionally, **PERFORM** a VT-1 Visual Examination to assess the structural condition of areas affected by repair/replacement activities.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.

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- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 2. Visual Examination of Noncoated Visible Surfaces

PERFORM a VT-1 Visual Examination (as modified by 10CFR50.55a(b)(2)(ix)(G)) of Item E4.11 (*Noncoated Visible Surfaces*) requiring augmented examination as those identified in IWE-1240 for evidence of cracking, discoloration, wear, pitting, excessive corrosion, gouges, surface discontinuities, dents and other signs of surface irregularities.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **ACCEPT** suspect areas by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWE-3122.
- D. **When** specified as a result of the engineering evaluation, **PERFORM** supplemental examinations in accordance with IWE-3200.
- 4.6.7. Standards for Examination Category E-D, Seals, Gaskets, and Moisture Barriers in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. VT-3, Visual Examination of Seals and Gaskets

EXAMINE the seals and gaskets on airlocks, hatches and other devices for wear, damage, erosion, tears, surface cracks, or other defects that may violate the leak-tight integrity.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **CORRECT** conditions that may violate containment leak-tight by repair or replacement in accordance with IWE-3122.2 or IWE-3122.3 (1992 Edition and 1992 Addenda only).
- 2. VT-3, Moisture Barriers

EXAMINE the internal and external containment moisture barrier materials at concrete-to-metal interfaces intended to prevent intrusion of moisture against the pressure retaining metal containment shell or liner for wear, damage, erosion, tears, surface cracks, or other defects that may violate the leak-tight integrity.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **CORRECT** conditions that may violate leak-tight by repair or replacement IWE-3122.2 or IWE-3122.3 (1992 Edition and 1992 Addenda only).
- 4.6.8. Standards for Examination Category E-G, Pressure Retaining Bolting in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. VT-1, Visual Examination of Bolted Connections

EXAMINE the bolts, nuts, bushings, washers and threads in base material and flange ligaments between threaded stud holes.

- A. **RECORD** all indications in accordance with Attachment 4.
- B. **COMPARE** the recorded indications to the owner defined preestablished acceptance criteria/standards.
- C. **CORRECT** conditions that cause bolted connections to violate either containment leak-tight or structural integrity by replacement in accordance with IWE-3122.2 (1998 Edition and later) or IWE-3122.3 (1992 Edition and 1992 Addenda).
- 4.7. <u>Standards for Examination Category L-A, Class CC Components (Concrete)</u>
- 4.7.1. Examination Boundary
 - 1. The examination boundary for the concrete shells shall **INCLUDE** the ACCESSIBLE surface areas.
- 4.7.2. Standards for Examination of Concrete in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. Concrete surface areas, including coated areas, except those exempted by IWL-1220(b), shall be VT-3C visual examined for evidence of conditions indicative of damage or degradation, such as defined in ACI 201.1 R-68 in accordance with IWL-2310(b).
 - 2. Selected areas, such as those that indicate suspect conditions, shall receive a VT-1C examination in accordance with IWL-2310(a).
 - 3. Concrete extending 2'-0" from the bearing plate for tendons selected in accordance with IWL-2520 and IWL-2521 shall receive a VT-1C examination.
 - 4. The examination shall be performed by, or under the direction of, the Responsible Engineer.

- 5. Visual examinations may be performed from floors, roofs, platforms, walkways, ladders, ground surface, or other permanent vantage point, unless temporary close-in access is required by the inspection plan.
- 6. **RECORD** all indications in accordance with Attachment 6.
- 7. The recorded indications are acceptable for continued operation without further corrective actions if accepted by the RE.
- 8. **ACCEPT** the recorded indications, which have evidence of damage or degradation sufficient to warrant further corrective actions as determined by the RE, by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWL-3210.
- 4.7.3. Standards for Examination of Concrete in accordance with ASME Section XI, 1998 Edition and later;
 - 1. All Concrete surface areas, including coated areas, except those exempted by IWL-1220(b), shall be General Visual examined (conducted by a Certified VT-3C Examiner or Engineer, as applicable) to assess the general structural condition of containments. **PERFORM** the General Visual examination in sufficient detail to identify areas of concrete deterioration and distress, such as described in ACI 201.1 R-68 and ACI 349.3R in accordance with IWL-2310(a).
 - 2. Selected areas, such as those that indicate suspect conditions, shall receive a Detailed Visual examination (conducted by a Certified VT-1C Examiner or Engineer, as applicable). **PERFORM** the Detailed Visual examination to determine the magnitude and extent of deterioration and distress in accordance with IWL-2310(b).
 - 3. **RECORD** all indications in accordance with Attachment 6.
 - 4. The recorded indications are acceptable for continued operation without further corrective actions if accepted by the RE.
 - 5. **ACCEPT** the recorded indications, which have evidence of deterioration and distress sufficient to warrant further corrective actions as determined by the RE, by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWL-3210.

4.8. <u>Standards for Examination Category L-B Unbonded Post Tensioning Systems</u> (Tendons)

4.8.1. Examination Boundary

The examination boundary shall include containment tendon anchorage hardware including bearing plates, anchor heads, shims, wedges and wire button-heads, as a minimum.

- 1. Concrete extending 2'-0" from the bearing plate for tendons selected in accordance with IWL-2520 and IWL-2521 shall receive a Detailed Visual examination (conducted by a Certified VT-1C Examiner or Engineer, as applicable). **PERFORM** the Detailed Visual examination to determine the condition (e.g., cracks, wear or corrosion) of tendon wires or strands and anchorage hardware as described in IWL-2524.1.
- 4.8.2. Standards for Unbonded Post Tensioning System (Tendons) in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. **PERFORM** a VT-1 examination of tendon anchorage components for evidence of free water, active corrosion, broken or protruding wires, missing button-heads, misaligned or displaced shims, and cracks.
 - A. **RECORD** all indications in accordance with Attachment 5.
 - B. If free water is observed, then QUANTIFY amount of free water.
 - C. The recorded indications are acceptable for continued operation without further corrective actions if accepted by the RE.
 - D. **ACCEPT** the recorded indications, which have evidence of damage or degradation sufficient to warrant further corrective actions as determined by the RE, by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWL-3210.
- 4.8.3. Standards for Unbonded Post Tensioning System (Tendons) in accordance with ASME Section XI, 1998 Edition and later;
 - 1. **PERFORM** a Detailed Visual examination (conducted by a Certified VT-1 Examiner or Engineer, as applicable) to determine the condition (e.g., cracks, wear or corrosion) of tendon wires or strands and anchorage hardware as described in IWL-2524.1.
 - A. **RECORD** all indications in accordance with Attachment 5.
 - B. If free water is observed, then QUANTIFY amount of free water.
 - C. The recorded indications are acceptable for continued operation without further corrective actions if accepted by the RE.
 - D. **ACCEPT** the recorded indications, which have evidence of deterioration and distress sufficient to warrant further corrective actions as determined by the RE, by engineering evaluation, or **REPAIR/REPLACE** in accordance with IWL-3210.
- 4.9. Examination of reinforced steel of IWL Concrete Containments

- 4.9.1. Standards for reinforced steel of IWL Concrete Containments in accordance with ASME Section XI, prior to 1998 Edition;
 - 1. Exposed reinforcing steel identified during as found examination or that exposed during concrete repair shall receive a VT-1 examination.
 - A. **RECORD** all indications in accordance with Attachment 6.
 - B. The recorded indications shall be evaluated by the RE to determine necessary corrective actions.
- 4.9.2. Standards for reinforced steel of IWL Concrete Containments in accordance with ASME Section XI, 1998 Edition and later;
 - 1. Exposed reinforcing steel identified during as found examination or that exposed during concrete repair shall receive a Detailed Visual Examination(conducted by a Certified VT-1 Examiner or Engineer, as applicable). **PERFORM** a Detailed Visual examination to determine the condition of as found reinforcing steel or that exposed as a result of removal of defective concrete as described in IWL-4220(c).
 - A. **RECORD** all indications in accordance with Attachment 6.
 - B. The recorded indications shall be evaluated by the RE to determine necessary corrective actions.
- 4.10. <u>Evaluation</u>
- 4.10.1. **NOTIFY** the Station RE or RI for evaluation of recordable indications identified during visual examinations of IWE and/or IWL components and for comparison to previously recorded indications.
 - 1. Any recorded indications, discontinuities and/or flaws, **shall** be documented in an Issue Report (IR) and **then** follow the evaluation process specific to the station.
- 4.11. <u>Reporting</u>
- 4.11.1. **INCLUDE** as a minimum in the Visual Examination NDE Report the following information. **USE** the applicable Attachment 4, 5, 6 or equivalent, to document examination results. Other equivalent generated forms may be used.
 - Station;
 - Unit;
 - Examination Report number, if applicable;
 - Examination Date;
 - Examination procedure and revision;
 - Examiner/Evaluator printed name, signature, NDE level and date;

- Identification of component (e.g., EIN, EID, System, etc.);
- Type of examination (direct or remote);
- Illumination used;
- M&TE;
- Direct Visual aids used;
- Remote Visual equipment used;
- Examination results;
- RECORD location and size of the Recordable Indication (RI) as required, to perform an accurate evaluation and use during subsequent evaluations.
- **ATTACH** a sketch or drawing if required.
- 4.11.2. **RECORD** on the Visual Examination NDE Report, Attachment 4, 5, or 6 (or equivalent), the Containment Visual Examination results associated with ASME Section XI repairs or replacements. These records shall become part of the final Work Order (WO) documentation.
- 4.11.3. **RECORD** on Attachment 4, 5, or 6, or equivalent, the Containment Visual Examination performed by the Examiner/Evaluator **and FORWARD** for a Station/Admin Review and Authorized Nuclear Inservice Inspector (ANII) Review, as applicable. **TRANSFER** to the Program Owner/Engineer for inclusion in the ASME Section XI Program and Work Order Package in accordance with the applicable procedures.
 - 1. All Visual Examination NDE Reports identifying a Recordable Indication (RI)or Reportable Indication (RI) and/or an Unacceptable Condition **shall** receive an independent Level III, RE or RI Review for resolution, prior to closure of the task and transferring to ANII for review.
 - 2. An independent review by a Level III, RE or RI and ANII may not be applicable at all stations. If any reviews are not applicable to the specific station, the review/date areas shall be completed by placing N/R (Not Required) on the available line, prior to closure of the task.
- 4.12. <u>Final Conditions</u>
- 4.12.1. **LEAVE** the surface of the part or component in a better than found condition.
- 5. **<u>RETURN TO NORMAL</u>** None

6. **REFERENCES**

- 6.1. <u>Commitments</u> None
- 6.2. American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1992 Edition, 1992 Addenda through 2001 Edition, 2003 Addenda including December 2003 Erratum.

- 6.3. ER-AA-330-002, Inservice Inspection of Welds and Components.
- 6.4. ER-AA-330-005, Visual Examination of Section XI Class CC Concrete Containment Structures.
- 6.5. ER-AA-330-006, Inservice Inspection and Testing of The Pre-Stressed Concrete Containment Post Tensioning Systems.
- 6.6. ER-AA-330-007, Visual Examination of Section XI Class MC Surfaces and Class CC Liners.
- 6.7. ER-AA-330-009, ASME Section XI Repair / Replacement Program.
- 6.8. ER-AA-335-001, Qualification and Certification of Nondestructive Examination (NDE) Personnel.
- 6.9. The American Concrete Institute Specification ACI 201.1 R-68, 1984 Edition.
- 6.10. The American Concrete Institute Specification ACI 349.3 R-96, 1996 Edition.
- 6.11. Title 10, Code of Federal Regulations (10CFR) 50.55a Paragraphs (b)(2)(viii) and (b)(2)(ix).
- 6.12. Engineering Change (EC) 0000365662-000.

7. ATTACHMENTS

- 7.1. Attachment 1, Definitions of Discontinuities in Concrete
- 7.2. Attachment 2, Definitions of Coating Failures
- 7.3. Attachment 3, Definitions of Post Tensioning System (Tendons) Indications
- 7.4. Attachment 4, ASME IWE (Class MC) Containment Visual Examination NDE Report
- 7.5. Attachment 5, ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report
- 7.6. Attachment 6, ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report

ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 1 of 6

- A.1. **CRACK** A complete or incomplete separation, of either concrete or masonry, into two or more parts produced by breaking or fracturing.
- A.1.1. **CHECKING** Development of shallow cracks, closely spaced by irregular intervals on the surface of plaster, cement paste, mortar, or concrete.
- A.1.2. **CRAZE CRACKS** Fine random cracks or fissures in a surface of plaster, cement paste, mortar, or concrete.
- A.1.2.1. **CRAZING** The development of craze cracks; the pattern of craze cracks existing in a surface.
- A.1.3. **D-CRACKING** A series of cracks in concrete near and roughly parallel to joints, edges, and structural cracks.
- A.1.4. **DIAGONAL CRACK** In a flexural member, an inclined crack caused by shear stress, usually at about 45 deg to the axis; or a crack in a slab, not parallel to either the lateral or longitudinal directions.
- A.1.5. **HAIRLINE CRACKS** Cracks in an exposed concrete surface having widths so small as to be barely perceptible.
- A.1.6. **PATTERN CRACKING** Fine openings on concrete surfaces in the form of a pattern; resulting from a decrease in volume of the material near the surface, or increase in volume of the material below the surface, or both.
- A.1.7. **PLASTIC CRACKING** Cracking that occurs in the surface of fresh concrete soon after it is placed and while it is still plastic.
- A.1.8. SHRINKAGE CRACKING Cracking of a structure or member due to failure in tension caused by external or internal restraints as reduction in moisture content develops, or as carbonation occurs, or both.
- A.1.9. **TEMPERATURE CRACKING** Cracking due to tensile failure, caused by temperature gradient in members subjected to external restraints or by temperature differential in members subjected to internal restraints.
- A.1.10. **TRANSVERSE CRACKS** Cracks that develop at right angles to the long direction of the member.

ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 2 of 6

- A.2. **DETERIORATION** 1) Physical manifestation of failure of a material (e.g., cracking, delamination, flaking, pitting, scaling, spalling, straining) caused by environmental or internal autogenous influences or hardened concrete as well as other materials. 2) Decomposition of material during either testing or exposure to service.
- A.2.1. **ABRASION DAMAGE** Wearing away of a surface by rubbing and friction.
- A.2.2. **BLISTERING** The irregular raising of a thin layer, frequently 25 to 300 mm in diameter, at the surface of placed mortar or concrete during or soon after completion of the finishing operation; blistering is usually attributed to early closing of the surface and may be aggravated by cool temperatures. Blisters also occur in pipe after spinning or in a finish plastic coat in plastering as it separates and draws away from the base coat.
- A.2.3. CAVITATION DAMAGE Pitting of concrete caused by implosion, i.e., the collapse of vapor bubbles in flowing water, which form in areas of low pressure and collapse as they enter areas of higher pressure.
- A.2.4. **CHALKING** Formation of a loose powder resulting from the disintegration of the surface of concrete or of applied coating, such as cement paint.
- A.2.5. **<u>CORROSION</u>** destruction of metal by chemical, electrochemical, or electrolytic reaction with its environment.
- A.2.6. **<u>CURLING</u>** The distortion of an originally essentially linear or planar member into a curved shape such as the warping of a slab due to creep or to differences in temperature or moisture content in the zones adjacent to its opposite faces.
- A.2.7. **DEFLECTION** Movement of a point on a structure or structural element, usually measured as a linear displacement transverse to a reference line or axis.
- A.2.8. **DEFORMATION** A change in dimension or shape.
- A.2.9. **DELAMINATION** A separation along a plane parallel to a surface as in the separation of a coating from a substrate or the layers of a coating from each other, or in the case of a concrete slab, a horizontal splitting, cracking or separation of a slab in a plane roughly parallel to, an generally near, the upper surface; found frequently in bridge decks and other types of elevated reinforced-concrete slabs and may be caused by the corrosion or reinforcing steel; also found in slabs on grade caused by development, during the finishing operation, of a plane of weakness below the densified surface; or caused by freezing and thawing, similar to spalling, scaling, or peeling except that delamination affects large areas and can often be detected by tapping.

ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 3 of 6

- A.2.10. **DISINTEGRATION** Reduction into small fragments and subsequently into particles.
- A.2.11. **DISTORTION** See Deformation.
- A.2.12. **DUSTING** The development of a powdered material at the surface of hardened concrete.
- A.2.13. **EFFLORESCENCE** -A deposit of salts, usually white, formed on a surface, the substance having emerged in solution from within either concrete or masonry and subsequently been precipitated by evaporation.
- A.2.14. **EROSION** Progressive disintegration of a solid by the abrasive or cavitation action of gases, fluids, or solids in motion.
- A.2.15. **EXFOLIATION** Disintegration occurring by peeling off in successive layers; swelling up and opening into leaves or plates like a partly opened book.
- A.2.16. **EXUDATION** A liquid or viscous gel-like material discharged through a pore, crack, or opening in the surface of concrete.
- A.2.17. **JOINT SPALL** A spall adjacent to a joint.
- A.2.18. **<u>PITTING</u>** Development of relatively small cavities in a surface; in concrete, localized disintegration, such as a popout; in steel, localized corrosion evident as minute cavities on the surface.
- A.2.19. **PEELING** A process in which thin flakes of mortar are broken away from a concrete surface, such as by deterioration or by adherence of surface mortar to forms as forms are removed.
- A.2.20. **POPOUT** The breaking away of small portions of a concrete surface due to localized internal pressure, which leaves a shallow, typical conical, depression.
- A.2.20.1. **POPOUTS, SMALL** Popouts leaving holes up to 10 mm in diameter, or the equivalent.
- A.2.20.2. **POPOUTS, MEDIUM** Popouts leaving holes between 10 and 50 mm in diameter, or the equivalent.
- A.2.20.3. **POPOUTS, LARGE** Popouts leaving holes greater than 50 mm in diameter, or the equivalent.

ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 4 of 6

- A.2.21. **SCALING** Local flaking or peeling away of the near-surface portion of hardened concrete or mortar; also of a layer from metal.
- A.2.21.1. **SCALING, LIGHT** Loss of surface mortar without exposure of coarse aggregate.
- A.2.21.2. **SCALING, MEDIUM** Loss of surface mortar 5 to 10 mm in depth and exposure of coarse aggregate.
- A.2.21.3. **SCALING, SEVERE** Loss of surface mortar 5 to 10 mm in depth with some loss of mortar surrounding aggregate particles 10 to 20 mm in depth.
- A.2.21.4. **SCALING, VERY SEVERE** Loss of coarse aggregate particles as well as mortar, generally to a depth greater than 20 mm.
- A.2.22. **SPALL** A fragment, usually in the shape of a flake, detached from a larger mass by a blow, by the action of weather, by pressure, or by expansion within the large mass.
- A.2.22.1. **SMALL SPALL** A roughly circular depression not greater than 20 mm in depth or 50 mm in any dimension.
- A.2.22.2. **LARGE SPALL** May be roughly circular or oval or in some cases elongated, more than 20 mm in depth and 150 mm in greatest dimension.
- A.2.23. **WARPING** A deviation of a slab or wall surface from its original shape, usually caused by either temperature or moisture differentials or both within the slab or wall.

ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 5 of 6

- A.3. Textural features and phenomena relative to their development.
- A.3.1. <u>AIR VOID</u> A space in cement paste, mortar or concrete filled with air; an entrapped air void is characteristically 1 mm or more in size and irregular in shape; an entrained air void is typically between 10 mm and 1 mm in diameter and spherical or nearly so.
- A.3.2. **BLEEDING** The autogenous flow of mixing water within, or its emergence from, newly placed concrete or mortar; caused by the settlement of the solid materials within the mass; also called water gain.
- A.3.3. **<u>BUGHOLES</u>** Small regular or irregular cavities, usually not exceeding 25 mm in diameter, is resulting from entrapment of air bubbles in the surface of formed concrete during placement and consolidation.
- A.3.4. <u>COLD-JOINT LINES</u> Visible lines on the surfaces of formed concrete indicating the presence of joints where one layer of concrete had hardened before subsequent concrete was placed.
- A.3.5. **DISCOLORATION** departure of color from that which is normal or desired.
- A.3.6. **HONEYCOMB** Voids left in concrete due to failure of the mortar to effectively fill the spaces among coarse aggregate particles.
- A.3.7. **INCRUSTATION** A crust or coating, generally hard, formed on the surface of concrete or masonry construction or on aggregate particles.
- A.3.8. **JOINT** A physical separation in concrete, whether precast or cast-in-place, including cracks if intentionally made to occur at specified locations; also the region where structural members intersect such as a beam-column joint.
- A.3.9. **LAITANCE** A layer of weak and nondurable material containing cement and fines from aggregates, brought by bleeding water to the top of overwet concrete; the amount is generally increased by overworking or over-manipulating concrete at the surface by improper finishing or by job traffic.
- A.3.10. **SAND POCKET** A zone in concrete or mortar containing fine aggregate with little or no cement.
- A.3.11. **SAND STREAK** A streak of exposed fine aggregate in the surface of formed concrete, caused by bleeding.
- A.3.12. **SEGREGATION** The differential concentration of the components of mixed concrete, aggregate, or the like, results in non-uniform proportions in the mass.

ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 6 of 6

- A.3.13. **STALACTITE** A downward-pointing deposit formed as an accretion of mineral matter produced by evaporation of dripping water from the surface of concrete, commonly shaped like an icicle.
- A.3.14. **STALAGMITE** An upward-pointing deposit formed as an accretion of mineral matter produced by evaporation of dripping water, projecting from the surface of concrete, commonly conical in shape.
- A.3.15 **STRATIFICATION** The separation of overwet or overvibrated concrete into horizontal layers with increasingly lighter material toward the top; water, laitance, mortar, and coarse aggregate tend to occupy successively lower positions in that order; a layered structure in concrete resulting from placing of successive batches that differ in appearance; occurrence in aggregate stockpiles of layers of differing grading or composition; a layered structure in a rock foundation.
- A.3.16 **WATER VOID** Void along the underside of an aggregate particle or reinforcing steel which formed during the bleeding period; initially filled with bleed water.

ATTACHMENT 2 Definitions of Coating Failures Page 1 of 1

- B.1. **DISCOLORATION** Change in color of the coating, fading. Cause could be age, heat, dye or pigment bleeding or surface contamination (dye penetration, grease, dirt, etc.)
- B.2. <u>CHIPPING</u> Small void in coating system caused by impact from foreign object.
- B.3. **CHALKING** A surface phenomenon that appear soft or powdery. The cause is a breakdown in coating binder, which disintegrates, leaving the surface covered with pigment.
- B.4. <u>CHECKING</u> Appears as small breaks in coating surfaces that are formed as coating ages and becomes harder and more brittle. Checking, for the most part, is a formulation related to reaction; were the resins and pigments do not properly combine.
- B.5. **CRACKING (COATING)** Appears as non-linear line running through the coating system. Cracking is caused by expansion or contraction throughout the film layer and the film and substrate (primer or metal surface).
- B.6. **FLAKING/PEELING** Appears as flaking or heavy peels on the surface of the metal. It is generally caused where the tensile strength of the coating is higher than the adhesive strength or bond strength.
- B.7. <u>**BLISTERING**</u> Appears as large or small, round or hemispherical projections of the coating from the surface and are either dry or liquid filled. The usual cause of the condition is the penetration of moisture through an area of poor adhesion.
- B.8. **<u>PINPOINT RUST</u>** Appears as small specks of rust or corrosion. Cause may be lower or the absence of zinc/binder ratio, where pinpoints of rust propagate.
- B.9. **<u>UNDERCUTTING</u>** Appears as a raised coated rust bloom. Undercutting is actually rust forming under the coating and acting as a wedge to push the coating of the metal surface.
- B.10. <u>MINOR RUST</u> A degree of in the form of iron oxide formation on steel, where no apparent base metal is lost.
- B.11. **MEDIUM RUST** A degree of in the form of iron oxide formation on steel, where less than 5% of the base metal is lost.
- B.12. **MAJOR RUST** A degree of in the form of iron oxide formation on steel, where more than 5% of the base metal is lost.

ATTACHMENT 3 Definitions of Post Tensioning System (Tendons) Indications Page 1 of 1

- C.1. <u>ACTIVE CORROSION</u> -- Corrosion on a component or surface that exhibits metal loss that has occurred since fabrication or construction, and / or exhibits pitting visible to the naked eye. Active corrosion is usually a reddish / rust color.
- C.2. **BROKEN WIRE** -- A wire within a tendon assembly that is broken and not capable of accepting pre-stress load. Wires that are excessively protrude from the anchorage components are suspected to be broken.
- C.3. **<u>MISSING BUTTON HEAD</u>** -- The end of the deformed portion of a wire that accepts the pre-stressed force is missing. The end of the wire may be visible within the anchorage.
- C.4. **PROTRUDING OR UNSEATED WIRE** -- A wire within a tendon assembly that extends beyond a tendon anchorage after stressing and is not seated against the anchorage.
- C.5. **EXCESSIVE SHIM GAPS** -- Shims that have slipped out of position leaving gaps in excess of construction tolerances between the halves.
- C.6. **UNEVEN SHIM STACK** -- Shims that have shifted out of position creating a condition where the pre stress load is not evenly distributed over the shim stack assembly.
- C.7. **FREE WATER** Water seeping or dripping from tendon anchorage components or within the grease can. Quantify all free water.

ATTACHMENT 4 ASME IWE (Class MC) Containment Visual Examination NDE Report Page 1 of 1

| Station: Unit | :: Da | ate: | Report No: | |
|---|---|---|---|--|
| System: Component | | | WO No(s).: | |
| Location: Building: | Elev.: | Col.: | Row: Azimu | th/Radius: |
| Exam Type: DV DC DV | T-1 🗍 VT-3 | Type Of Exa | m: Direct Remote Mat | І. Туре: |
| Design Drawing(s) | | Visual Aids: | | |
| Surface: DID |] OD | Surface / Co | mponents Coated: 📋 YES | |
| M&TE Used: | Test Card | UTC or Seria | al No. Cal. D | Oue Date: |
| Illumination Used | | Illumina | tion Verified: Date: | Time: |
| Special / Specific Instructions: | | | | |
| Component / Item Number and Do (e.g. EIN, EID, etc.) | escription | RESULTS | Explanation / N (As a minimum, Record Loc Recordable Indications | cation and Size of |
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| Supplemental Information: Yes | | Sketch | o Video Other (Describe): | |
| | Results: | Acceptable | Yes No | |
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ATTACHMENT 5 ASME IWL (Class CC) Containment Tendon Anchorage Detailed Visual or VT-1 Visual Examination NDE Report Page 1 of 1

| WO No(s):: Tendon Anchorage No.: Tendon End:ShopField Location: Tunnel, Gallery, Buttress: Elevation: Bearing Plate I.D.: Bearing Plate I.D. Anchor Head I.D. Bushing I.D. Exam Type: | Station: | Unit: | | Date: | | | R | Report No: | | | |
|---|----------------|---------------------------|----------|--------------------|---------|------------|---------------|---------------------------------------|-------------|--------|-------|
| Bearing Plate I.D. Anchor Head I.D. Bushing I.D. Exam Type: DV UVT-1 Type Of Exam: Direct Remote As Found Exam As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned Design Drawing(s) Visual Alds: Cal. Due Date: M&TE Used: Test Card UTC or Serial No. Cal. Due Date: Special / Specific Instructions: Illumination Verified: Date: Time: Component / Item Number and Description RESULTS (Sketch Shall Be Attached Depicting Location Of All Missing, Protruding, Unseated Wires) Results Legend: NI RI - Recordable Indication [O - Information Only Results Legend: NI - No Indications RI - Recordable Indication Type Codes: O. Other (Explain) B Missing Wires H. Cracks O. Other (Explain) B Missing Buton Heads J. Nicks, Gouges, Mechanical Damage D. Other (Explain) C Protruding / Unseated Wires J. Nicks, Gouges, Mechanical Damage D. E. Active Corosion L. Excessive Shim Gaps C. Oracides L. Excessive Shim Gaps No | WO No(s).: | | | Tendon Anch | norage | No.: | | Tendon End | : 🗌 Shop | 🗌 Fi | eld |
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ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE

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| Title <u>RB Tendon E</u> Applicability/Scope | | , , | TN Corrective Ma | | ocedure SE LEVEL | Revision No. | 9-Y-83 7 |
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| | TMI - Unit 1 Corrective Maintenance Procedure | 1410-Y-83 |
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| Title | · · · · · · · · · · · · · · · · · · · | Revision No. |
| RB Tendon End Cap Installa | tion | 7 |

1.0 PURPOSE

1.1 This procedure provides guidance for the installation and/or modification of the tendon end caps on the TMI-1 Reactor Building.

2.0 REFERENCES

- 2.1 1002, "Rules for the Protection of Employees Working on Electrical and Mechanical Apparatus"
- 2.2 1440-Y-3, "Scaffold Construction/Inspection and Use of Extension Ladders"
- 2.3 CMR 93-035, "RB Tendon End Cap Modification"
- 2.4 1301-9.1, "Reactor Building Structural Integrity Tendon Surveillance"
- 2.5 1410-Y-11, "Threaded Piping and Fitting Maintenance"
- 2.6 1407-15 "Control and Use of Lifting/Rigging Equipment"

3.0 PLANT STATUS

3.1 Operating or shutdown.

4.0 PREREQUISITES

- Obtain Shift Manager/Control Room Supervisor permission prior to commencing this maintenance and request he specify any Tech. Spec. limitations or limitations due to plant operation applicable during performance of this procedure.
- Initiate RWP if working in a radiologically controlled area.
- If lifting and handling equipment is to be used, ensure rigging and lifting devices have been inspected/approved for use in accordance with procedure 1407-15.

5.0 LIMITS AND PRECAUTIONS

- 5.1 Tendon end caps located in the vicinity of the Main Steam safety relief value discharge stacks may not be worked on while the plant is at power.
- 5.2 Care should be exercised while working from scaffolds, platforms, ladders, high or restricted access locations. Respect for the safety and well-being of other personnel in the area must be observed.
- 5.3 During grease replacement the grease could be hot and direct contact with the grease should be avoided.
- 5.4 The grease could be under pressure. Remove plugs and nuts slowly to allow pressure, if any, to vent off.
- 5.5 Spilled grease could create a slipping safety hazard and damage roof surfaces. During all operations, it should be cleaned up and placed into waste containers.

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RB Tendon End Cap Installation

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- 5.6 Tendons located near hot MS or FW penetrations may contain hot, thin grease which makes end cap work more difficult and possibly hazardous. It may be preferable to work on those during a plant outage, if practical.
- 5.7 When conditional step(s) do not apply, the performer shall continue to the next numbered step.

6.0 DESCRIPTION AND LOCATION OF SYSTEM/ASSEMBLY

- 6.1 The original RB tendon end cap design is as shown in Attachment 2.
- 6.2 The latest RB tendon end cap design is as in Attachment 3.
- 6.3 All tendon end caps are accessible from outside the Reactor Building. The end caps for the hoop tendons are located on both sides of each of six buttresses evenly spaced around the Reactor Building. The end caps for the dome tendons are located on the outside diameter of the dome. The vertical tendon end caps are located in the lower tendon access gallery under the RB mat and under the removable deck plates on top of the ring girder.

7.0 SPECIAL TOOLS, MATERIALS AND PERSONNEL QUALIFICATIONS

- 7.1 The supervisory personnel for administering the progress of this work and directing manpower shall be fit by skill, training and/or experience to implement this procedure.
- 7.2 The craft personnel responsible for the physical activities associated with this procedure shall be fit by skill, training or experience to perform their duties.
- 7.3 Miscellaneous hand tools.
- 7.4 Greasing Equipment (only required if end cap is being removed).
 - 7.4.1 Come-alongs and associated rigging. The end caps weigh approximately 200# when filled with grease.
 - 7.4.2 Drum belt heaters.
 - 7.4.3 Hand pump for pumping hot grease from a 55 gallon drum.
 - 7.4.4 Thermometer (calibrated) to measure replacement grease temperature 0-300°F).
 - 7.4.5 Viscosity Oll Co. Visconorust 2090P-4 Casing Filler Grease.
- 7.5 Plastic bags, plastic sheeting, rags, buckets and drums for waste grease.
- 7.6 Solvent for removing grease and cleaning equipment. (EPA 2000 or CRC Natural Degreaser Aerosol is acceptable to TMI).
- 7.7 Goodyear pliobond adhesive with brush top can or approved equal gasket cement. Commercial grade.
- 7.8 Spray galvanizing type paint made by LPS Research Laboratories, Inc. or approved EQUAL. Commercial grade.

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- 7.9 Modified 1 1/16" socket sets with body approximately 3" long in order to clear end cap hold-down studs on original type end cap hold-down configuration.
- 7.10 Cleaning rags.
- 7.11 Tendon End Cap fasteners, gaskets, and clamps.
 - 7.11.1 Top (Shop End), Vertical End Cap Materials:
 - Flat Under-Can Gaskets, 1 per end cap, SS # 286-110-0500-1 (Inland Ryerson Drawing No. 170WAC5) - 1/2 inch thick, closed cell neoprene, 17 1/2" O.D. (+1/16, -0) x 14 1/2" I.D. (+0, -1/16), Manufacturer - Rubatex Corp. or equal.
 - Stud Gaskets, 4 per end cap, SS# 929-031-3000-1. 1/8 inch thick neoprene, 3/8" O.D. x 5/8" I.D. Manufacturer - J.D. Rohrback Company of Lancaster or equal.
 - Belleville Spring Washers, 4 per end cap, SS# 000-454-4810-1.
 5/8" standard, Manufacturer Rolex Co. Hillside, NJ. or equal.
 - 7.11.2 Bottom (Field End), Vertical End Cap Materials:
 - O-Ring Gaskets, 1 per end cap SS# 459-046-7500-1. 5/8" cross-section, 17 1/4" I.D., 60 - 80 durometer neoprene.
 - 7.11.3 Hoop and Dome Tendon End Cap Materials:
 - Flat Under-Cap Gaskets, 1 per end cap, SS# 286-110-0500-1 (Inland Ryerson Drawing No. 170WAC5) - 1/2 inch thick, closed cell neoprene, 17 1/2" O.D. (+1/16, -0) x 14 1/2" I.D. (+0, -1/16), Manufacturer - Rubatex Corp. or equal.
 - End Cap Pipe Plugs, 4 per end cap, 1/2" NPT Galvanized.
 - End Cap Pipe Plugs, 1 per end cap, 1/4" NPT Galvanized.
 - Hold-Down Clamps; 4 per end cap, (Ref. P.O. 0436005), Manufacturer -Precision Surveillance or equal.
 - Hold-Down Bolts and Washers, 4 per end cap. 1" 8UNC x 2 1/2" Galvanized.
 - POP-A-PLUG, P/N PSC-0750-S, SSN 000-478-0820-1
 - POP-A-PLUG Installation Tool
 - Teflon tape thread sealant

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| RB Tendon End Cap | Installation | 7 |

8.0 **PROCEDURE**

General:

The RB tendon end caps will be re-installed in one of the following configurations depending upon which tendon group they are in:

- Preferred Configuration for Hoop and Dome (See Attachment 3) The cap is removed and the main gasket is replaced with the conventional Rubatex gasket. The original through-cap mounting bolting is replaced with hold down clamps, and the through-cap holes plugged with Pop-A-Plugs. A 1/4" vent plug is installed. The end cap is then filled with new filler grease.
- Primarily used on the upper end of vertical tendons (See Attachment 2). This alternative makes no changes to the existing design. A Rubatex gasket and "thru-can" bolting are used.
- Used on vertical tendon lower end caps. This makes no modifications to the existing design. An O-ring is installed in the end cap which is bolted directly into the bearing plate.
- 8.1 On Data Sheet 1, record the tendon identity and the end of the tendon which is having its end cap installed.
- 8.2 Deleted
- 8.3 End cap removal and prep (For tendon inspection or for replacement of main gasket).
 - 8.3.1 Vent off pressure by slowly removing the grease inlet plug.
 - 8.3.2 During the removal of the tendon end cap and until the reinstallation of the cap, keep track of the amount of grease lost or scrapped and record this amount on Data Sheet 1 for the tendon end cap being worked.
 - 8.3.3 Remove the four end cap hold down nuts and washer, if they exist. Pull the tendon end cap off and set it down in a secure location.
 - 8.3.4 Remove the hold down studs from the anchorage if they exist. If a stud cannot be removed from the anchorage, the entire ring may be removed although it is preferable to leave the ring in place.
 - 8.3.5 Clean and discard the old grease from the end cap and from the anchorage head and bearing plate as necessary to provide for proper placement of the new gasket or O-ring and retaining plate.
 - 8.3.6 Clean and dry the gasket seating surface of the tendon end cap and bearing plate using approved solvent or other approved cleaner.
 - 8.3.7 Note that this step is not applicable for vertical tendons. If not already installed, in the OD of the cap, approximately 6" from the flange and in line with the fill plug, drill and tap for a 1/4" NPT vent plug.
 - 8.3.8 Using a 1"-8 UNC tap or thread chaser, clean up the four bolt holes in the base plate around the end cap.

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| | 8.3.9 | | eady done, the four hold down stud holes are to be This method of plugging is with Pop-a-plugs, how ed. | | | | |
| | | 8.3.9.1 | Prior to installing a Pop-a-Plug, ensure that the gouges or scoring that would affect its ability to | | | | |
| | | 8.3.9.2 | Install the Pop-a-Plug in accordance with the r Use <u>no</u> pipe sealant. | nanufacturer's instructions. | | | |
| | | 8.3,9,3 | if unable to install a Pop-a-Plug, tap the hole to Pipe plug. Apply tefion tape and install the plu | | | | |
| 8.4 | Installati | on of repla | cement Rubatex Gasket configuration for hoop an | d dome tendons. | | | |
| | 8.4.1 | Bond the | Rubatex gasket to the face of the flange using pl | iobond. | | | |
| | 8.4.2 | | Align the tendon end cap over the anchorage against the bearing plate using care to avoid damaging or misaligning the gasket which has been glued to the end cap flange. | | | | |
| | 8.4.3 | Secure four tendon end cap hold down clamps with boits and washers to the bearing plate holes and hand tighten them. | | | | | |
| | 8.4.4 | Recheck that the gasket has not slipped or become crimped and that the tendon end cap and hold down clamps are aligned properly. | | | | | |
| | 8.4.5 | Tighten (the Ruba | each bolt, equalizing the load on each as much as atex main gasket by approximately 1/8". (No torqu | possible, to evenly compress uling is required) | | | |
| | 8.4.6 | - | ease to 140°F to 200°F using a calibrated thermon n Data Sheet 1. | neter to obtain temperature and | | | |
| | 8.4,7 | the tend until it re | zontal and dome tendons, attach a vendor supplie on end cap and hand pump hot grease (140°F - 2 eaches a level 1 1/2" to 2" below the vent hole to a Record grease level on Data Sheet 1 | 00°F) into the tendon end cap | | | |
| | 8.4.8 | | flon tape to the grease inlet and vent plug threads vent plug and tighten them securely using an appl | | | | |
| | 8.4.9 | Verify th | at no grease is leaking. If leakage does exist, cor | rect the deficiency. | | | |
| | 8.4.10 | Record | amount of grease added on Data Sheet 1. | | | | |
| 8.5 | installat | ton of Rub | atex gasket with top (shop end) vertical "through-c | can" bolting. | | | |
| | 8.5.1 | Bond the | e Rubatex gasket to the face of the flange using P | liobond. | | | |
| | 8.5.2 | | e tendon and cap over the anchorage against the l ng or misaligning the gasket which has been glued | | | | |

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| 8.5,4 | Recheck that the gasket has not slipped or become crimp | eo ano that the tendon end car |
| 8.5.5 | Is property aligned. Tighten each nut, equalizing the load on each stud as muc compress the Rubatex main gasket by approximately 1/8" | ch as possible, to evenly |
| 8.5.5 | is property aligned. Tighten each nut, equalizing the load on each stud as mu | ch as possible, to evenly |
| | Is property aligned. Tighten each nut, equalizing the load on each stud as muc compress the Rubatex main gasket by approximately 1/8" | ch as possible, to evenly . (No torquing is required.) |

- 1. Heat grease to 140°F to 200°F using a calibrated thermometer to obtain temperature and record on Data Sheet 1.
- 2. Attach a vendor supplied Y-device to the grease inlet of the tendon end cap and hand pump hot grease (140°F to 200°F) into the tendon end cap until it reaches a level 2" to 3" below the vent hole to allow for the expansion of the grease. Record grease level on Data Sheet 1.
- 3. Apply teflon tape to the grease inlet and vent plug threads and install the grease inlet plug and the vent plug and tighten them securely using an approved thread sealant.
- 4. Verify that no grease is leaking and record it on Data Sheet 1. If leakage does exist, correct the deficiency.
- Record amount of grease added on Data Sheet 1.
- 8.6 Installation of O-Ring gaskets on lower vertical tendons with bearing plate bolting
 - 8.6.1 Bond the O-Ring gasket in place using Pliobond.
 - 8.6.2 Align the tendon end cap over the anchorage against the bearing plate using care to avoid damaging or misaligning the O-ring which has been glued to the end cap.
 - 8.6.3 Install the four tendon end cap hold down bolts and hand tighten them.
 - 8.6.4 Tighten each bolt, equalizing the load on each bolt as much as possible, to evenly compress the O-ring main gasket. The flange should be pulled up tight against the bearing plate. Bring the bolts to a "snug-tight"* condition and then tighten the bolts by an additional 1/4 to 1/3 turn of the bolt head. (*"Snug-tight" is defined as the tightness attained by the full effort of a person using an ordinary spud wrench.)

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- 8.6.5 It is required to refill the tendon duct void from the lower vertical tendon end when most of the tendon has been drained of its grease. The top (shop end) vertical tendon end grease inlet plug shall be removed during filling so that grease passes through the tendon duct void and out the top, until air has been purged from the system. No air gap is required when performing a total refill of the tendon duct void. Record grease temperature on Data Sheet 1.
- 8.6.6 Verify that no grease is leaking and record it on Data Sheet 1. If leakage does exist, correct the deficiency.
- 8.6.7 Record amount of grease added on Data Sheet 1.

9.0 ACCEPTANCE CRITERIA

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- 9.1 No grease leakage from the tendon end cap.
- 9.2 End cap verified to have an air space at the top to allow for expansion of the grease. (8.4.7 and 8.5.6 "Note"))
- 9.3 The work area has been cleaned of all debris and grease spilled during the work process.
- 9.6 Deet 1 (Attachment 1) is completed for each end cap that has had a grease change and is accuded in the work package. A copy of each data sheet is forwarded to the Lead Mechanical Engineer.

10.0 POST MAINTENANCE TESTING

Visual inspection to verify leak tightness. No leakage is acceptable.

11.0 ATTAC MENTS

- 11.1 Attachment 1 Data Sheet 1
- 11.2 Attachment 2 "Original Can Hold-Down Design"
- 11.3 Attachment 3 "Hoop and Dome Tendon End/End Can Assembly Latest Design"

ATTACHMENT 1 Data Sheet 1

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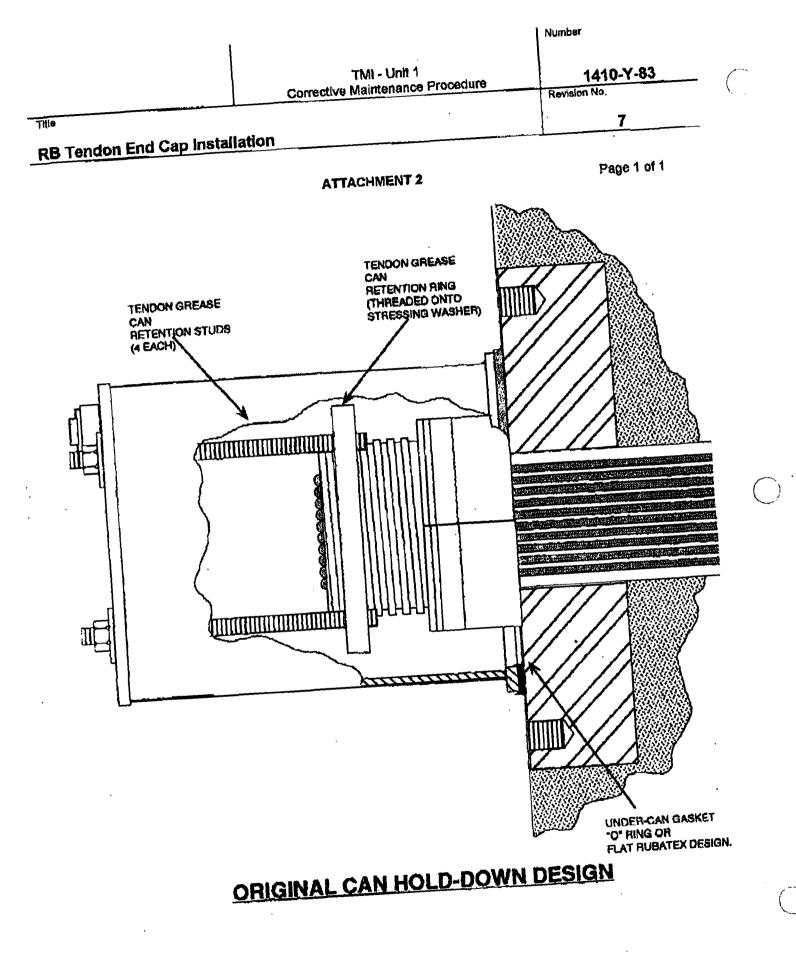
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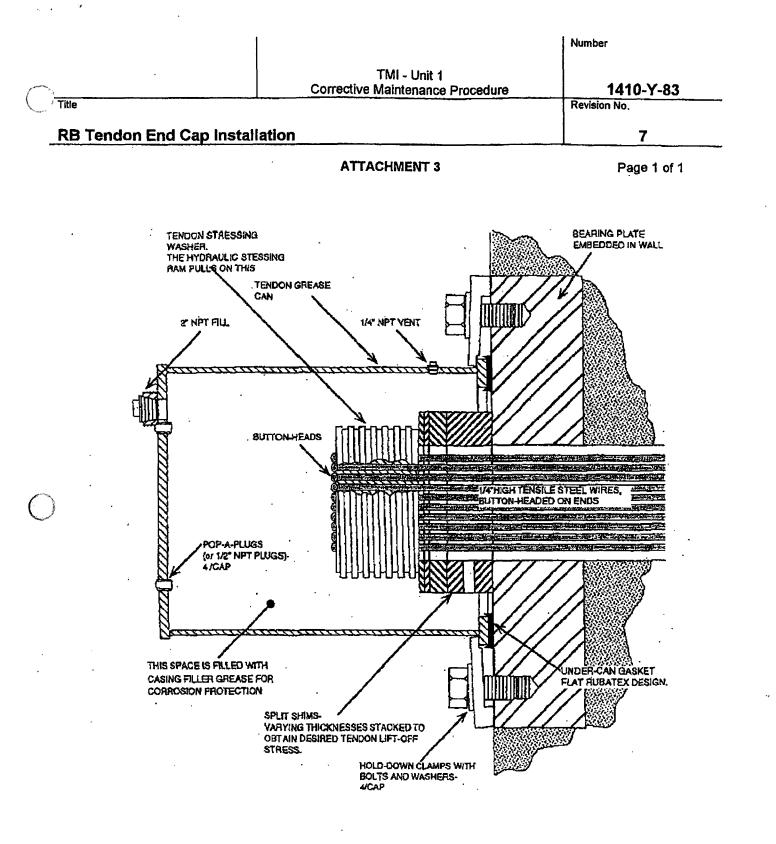
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|---|---|
| 8,1 Tendon Identity: | Tendon End: |
| 8.3.2 Amount of grease removed: | gallons |
| 8.4 Hoop an | nd Dome Tendons |
| 8.4.6 Replacement grease temperature: | °F (140°F to 200°F) |
| 8.4.7 Grease level below vent hole | inches (1½ to 2") |
| 8.4.9 Grease leaking Yes | No |
| 8.4.9 Amount of grease added | gallons |
| 8.5 Top V | ertical Tendons |
| 8.5.6(1) Replacement grease temperature | °F (140°F to 200°F) |
| 8.5.6(2) Grease level below vent hole | inches (2" to 3") |
| 8,5.6(4) Grease leaking Yes | No |
| 8.5.6(5) Amount of grease added | gallons |
| 8.6 Lower | Vertical Tendons |
| 8.6.5 Replacement grease temperature | °F (140°F to 200°F) |
| 8.6.6 Grease leakingYesYes | No |
| 8.6.7 Amount of grease added | gallons |
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| Calibrated Test Equip.: | Cal. Due Date: |
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HOOP & DOME TENDON END/END CAN ASSEMBLY LATEST DESIGN

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124-21



Three Mile Island Unit 1 Rt. 441 South Middletown, PA 17057

October 18th, 2010

MEMO: Acceptance of Tendon Surveillance Manual and Certifications

After review of the PSC Post Tensioning System In-Service Inspection Manual and the QC and VT inspector personnel certifications, we accept the personnel certifications and use of the Inspection Manual for the execution of the Augmented Surveillance of the SGRP affected tendons at Three Mile Island Unit 1.

Tendon Stressing Rams and other M&TE calibration records have also been reviewed and found to be acceptable for use during this surveillance.

Evan Johnson TMI Engineer

INTO

Howard Hill Responsible Engineer



Friday, October 22, 2010

MEMO: Tendon Wire Inspection Scope for V118

As a result of the discovery of two broken wires in tendon V118, TMI requests PSC to perform a continuity test of 100% of the remaining wires in this tendon. The broken wires are to be removed and returned to TMI Engineering for analysis and testing. The planned removal of a surveillance wire from the tendon for tensile testing shall be chosen to be a wire whose button head is on the opposite side of the anchorhead from the broken wire's buttonhead positions. PSC shall perform tensile testing of the surveillance wire as previously planned.

TMI also requests PSC to remove the end caps of the two adjacent vertical tendons and examine the anchorages for any similar conditions.

TMI Engineering

LowARD HIL

Responsible Engineer



To: Precision Surveillance Corp. From: Evan Johnson, TMI-1 Engineering Date: 24 Oct 10

Subject: TMI-1 2010 Tendon Surveillance / V118 (and other tendons as necessary) Wire Continuity Tests

Tendon V118 wire continuity tests may be done using any technique approved by Exelon Engineering or Responsible Engineer. The following technique is approved.

- Position the tendon and anchor heads to expose several inches of wire below the bottom anchor head.
- Attach a pulling device to the bottom end of each wire in sequence and pull down with a force of 5,500 - 6,000 lb to demonstrate continuity. Use a calibrated dynamometer to verify that a load of 6,000 lb is not exceeded. Continuity is considered to be demonstrated if a wire will carry a 5,500 lb load. Document dynamometer serial number, accuracy and cal due date as well as test results on a continuity test data sheet (to be provided).
- Broken wires will pull out at a lower force. Remove all broken wires from the tendon. Mark and coil or cut removed wires as directed by Engineering or Responsible Engineer. Record the peak force for each removed wire.

Evan Johnson TMI Engineering

Howard Hill Responsible Engineer

To: PSC From: Evan Johnson / TMI Engineering Date: 26 Oct 10

Evan Johnson

TMI Engineering

Subject: Vertical Tendon Shim Arrangement

Vertical tendons require at least one 4 inch shim at the bottom end. Additional shims may be added at the bottom as needed to allow installation of the upper end cap.

Howard Hill

Responsible Engineer

Topical Report 204 Revion 0 Attachment 8.7 Page 511 of 523

From: Evan.Johnson@exeloncorp.com [mailto:Evan.Johnson@exeloncorp.com]
Sent: Thursday, September 16, 2010 3:26 PM
To: Christopher Cox
Cc: Thomas.Geyer3@exeloncorp.com; Bruce.Kaplan@exeloncorp.com
Subject: RE: Tendon ST - Review and Discuss

Chris,

There is no normalization factor used in the SGRP tendon stress calculations. This is a specific attribute of these containment opening tendons. Also, these tendons forces will not be used to compute mean tendon forces for the containment structure. These tendons will have a much higher stress than the remainder of the tendon population and inclusion of these tendon forces in the mean calculations would be non-conservative.

Regards

Evan Johnson Aging Management Coordinator Engineering Programs, TMI (717) 948-8823

> Exelon Nuclear

Revision 5 Page 32 of 32

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| | ATTACHME | |
|--|--|---|
| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report | | |
| | Page 1 of | · · · · · · · · · · · · · · · · · · · |
| Station: TMT Unit: | | 23-2010 Report No: |
| System Containment Component: Containme | wt bldg. But | • |
| Location: Building: Containment Elev .: | | bl.: Row: Azimuth/Radius: |
| Exam Type: DV DV DVT-1C VT- | | xam: Direct Remote Matl. Type: Coucrete |
| Design Drawing(s) TMI 1-0015 | | is: Binoculars |
| Surface: ID (OD') | and the second second second second second second second second second second second second second second second | Components Coated: VES NO |
| M&TE Used None Test Ca | | erial No. N/A Cal. Due Date: N/A |
| Illumination Used Flashlight | lium | nation Verified: Date: 10-23-2010 Time: 1300 |
| Component / Item Number and | RESULTS | Explanation / Notes |
| | NI RI TYPE | IO (As a minimum, Record Location and Size of Recordable Indications as applicable) |
| Buttress 4 | | A Small cracks |
| 00411633 1 | | H Degraded grout patches |
| | | L oil stains |
| · · · · · · | | P Small Bugholes |
| | | |
| | | |
| | | All general area conditions previously reported, No change. |
| | | previously reported, NO Change. 1 |
| | Results | Legend: |
| NI - No Indications | s RI - Recorda Recordable Indica | ble Indication IO – Information Only |
| A. Cracks (Characterize and Size) G. S | Settlements Or De | |
| | Degraded Patches | |
| | Popouts , Voids, H Spalls | oneycomb O. Abrasion, Cavitation, Wear P. Air Voids / Bug Holes |
| E. Evidence Of Moisture K. (| Cold Joint Lines | Q. Efflorescence |
| | Corrosion Staining | R. Other (Explain) |
| Supplemental Information : Yes XNo | Sketch F suits: Acceptable | Photo □Video □ Other (Describe): ∑Yes □No |
| EXAMINER/EVALUATOR / | | |
| (Print & Sign W, Ravec Robbins W, Kan | ce Koblen | LEVEL DATE 10.25-2010 |
| (Print & Sign) | chrom C~ | DATE 10/28/2010 |
| This section to be completed on | ly if Examiner | Evaluator notes RI or Unacceptable condition. |
| RI or Unacceptable results Acceptable | 🗌 Yes 🔲 I | to NORI |
| Additional Actions: | | 10010- |
| (Action Request, Work Order, Issue Report, etc. initiate | d for Corrective Actin | 11)7 29 290010 |
| LEVEL III or RE REVIEW (as applicable) | lasa H | HawARD HILL DATE: 12 Oct 10 |
| ANII REVIEW (as applicable) | ph Sthel | by DATE: 11-4-10 |
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Revision 5 Page 32 of 32

ATTACHMENT 6

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report

| | Page 1 of 1 | Į |
|--|---|---|
| Station: THI Unit: | Date: 10-25-2010 Report | No: |
| System Containment Component: Contain | wat Arts. Butterss 5 WO No | D(S).: R2139507 |
| Location: Building: Configurment Elev | J | Azimuth/Radius: |
| Exam Type: DV DV VT-1C | T-3C Type Of Exam: Direct 🛛 Remote | Matl. Type: Concrete |
| Design Drawing(s) TMI 1-0015 | Visual Aids: Binoculars | |
| Surface: ID (D) | | S NO |
| M&TE Used: None Test | | Cal. Due Date: NA |
| Illumination Used Spotlight Special / Specific Instructions: | Illumination Verified: Date: 10-2 | 25-2010 Time: 1100 |
| Component / Item Number and | RESULTS Explanal | tion / Notes |
| Description (e.g. EIN, EID, etc.) | NI RI TYPE IO (As a minimum, Record Lo Recordable Indications as | ocation and Size of |
| Buttress 5 | A Small cracks | |
| X Note: The face of buttness | H Degraded grout pate | .hes |
| 5 is inaccessable due to | L Gil stains | |
| coverage by a ventilation | P Small Bugholes | |
| STACK. | C exposed embed pl | Ates |
| JUNCH: | | 4.4. |
| | All general area con | ditions previously |
| | Results Legend: | INGE. |
| NI - No Indicatio | ns RI - Recordable Indication IO - Information Only | <u> </u> |
| A. Cracks (Characterize and Size) G. B. Exposed Reinforcing Steel H. C. Exposed Metallic Items (Other) I. D. Evidence Of Grease Leakage J. E. Evidence Of Moisture K. F. Leaching Or Chemical Attack L. Supplemental Information : Yes XNo R | Popouts , Voids, Honeycomb O. Abrasion, (| eterioration Cavitation, Wear Bug Holes Ince Main) |
| (Print & Sign) W. RANCE Robbins W. Con | ne love LEVEL II | DATE 10-25-2010 |
| STATION/ADMIN REVIEW | | ATE 10/29/2010 |
| | nly if Examiner/Evaluator notes RI or Unac | |
| RI or Unacceptable results Acceptable Additional Actions: (Action Request, Work Order, Issue Report, etc. initia | I Yes INO NORI | |
| LEVEL III or RE REVIEW (as applicable) | Hava Art (Howard Hing) | ATE: 29 00-10 |
| ANII REVIEW (as applicable) | the fallety D. | ATE: 11-4-10 |
| | Page 1 of 1 | |

Revision 5 Page 32 of 32

| ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 |
|--|
| Station: TMT Unit: Date: 10-25-2010 Report No: |
| System Cantainment Component: Containment blig, Buttress 6 WO No(s) .: R2139507 |
| Location: Building: Containment Elev.: Col.: Row: Azimuth/Radius: |
| Exam Type: DV DV VT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Courrede |
| Design Drawing(s) TM_L1-0615 Visual Aids: BiNoculars Surface: ID (OD) Surface / Components Coated: I YES XI NO |
| Surface: ID OD Surface / Components Coated: YES X NO M&TE Used: None X Test Card UTC or Serial No. N/A Cal. Due Date: N/A |
| Illumination Used Sontlight Illumination Verified: Date: 10-25-2010 Time: 1/20 |
| Special / Specific Instructions: |
| Component / Item Number and RESULTS Explanation / Notes |
| Description NI RI TYPE IO (As a minimum, Record Location and Size of Recordable Indications as applicable) |
| Buttress 6 H Degraded grout patches |
| L oil stains P small busholes C exposed embed plates. |
| Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only |
| Recordable Indication Type Codes: A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metallic Items (Other) I. Popouts , Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : Yes XNo Sketch Photo Video |
| Results: Acceptable Yes No EXAMINER/EVALUATOR 0 0 |
| (Print & Sign) W. Rance Robbins W. Pance Valle LEVEL II DATE 10.25-201 STATION/ADMIN REVIEW Evan Johnson (DATE 10/29/2010 |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. |
| RI or Unacceptable results Acceptable Yes No NO CT Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) |
| LEVEL III OF RE REVIEW (as applicable) / (ACA JAC (NOW AND HAC DATE: 29 OCT 0 |
| ANII REVIEW (as applicable) Joseph Withelly DATE: 11-4-10 |
| Page 1 of 1 |

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| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Page 1 of 1 Station:MI | ATTACHMENT 6 | | | |
|--|---|--|--|--|
| Page 1 of 1 Station: | ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE | | | |
| Station: MI Unit: Unit: <td< td=""><td colspan="4">·</td></td<> | · | | | |
| System Containing: Containing: Containing: WO No(s): P2 139 507 Location: Building: Col: Row: Azimuth/Radius: Exam: Type: DV GV DV 11C XV: 3C Type OExam: Direct XRemote Mail: Type: Concrete Design Drawing(s): 7/11 - COL4 Visual Aids. Bixocul4r: Surface / Components Coated: YES NO M&TE Used: Move: W Test Card UT or Serial No. M/L Cal. Due Date: M/L Illumination Used Zicklickit: Illumination Verified: Date: Move: Date: Move: Date: Move: Special / Specific Instructions: Component / Item Number and Description RESULTS Explanation / Notes Component / Item Number and Description NI RI TYPE IO (As a minimum. Record Location and Size of Recordable Indications as applicable) Burghold: A Small cmrks General Area Coud-i+ious S previous Iv reported . No Change Recordable indication: Recordable indication: P lognaded growt PAtches L oil stains Burghold: General Area Coud-i+ious S previous Iv reported . No Change Pervious Iv reported . No Change A. Cracks (Characterize and Size) | | | | |
| Location: Buildingimed_ Elev: Col: Row: Azimuth/Radius: Exam Type: DV CV VIC XVIC XVIC Type Of Exam: Direct @Remote Mail. Type: //// Design Drawing(s) 7/LT (-00/4) Visual Aids <i>Bixou/ars</i> Surface: ID | Station: TMT Unit: UNIT Date: 10-23-2010 Report No: | | | |
| Exam Type: DV GV V1-1C QVT-3C Type Of Exam: Direct Matt Type: Automatic Design Drawing(s) THL I-004 Visual Aids Bivacu/ars Surface No MATE Used, Nove Itel Section Itel Section Itel Section No Cal Due Date: Automatic Matter Used, Nove Itel Section Itel Section Itel Section No Cal Due Date: Automatic Special / Specific Instructions: Component / Item Number and Description RESULTS Explanation / Notes Component / Item Number and Description NI RITYPE IO (As a minimum, Record Location and Size of Recordable Indications as applicable) Buthress I A Small Cmcks H Description No Buthress I A Small Cmcks L oil Staix5 Description Results Legend: Results Legend: Results Legend: No Change Description Ni - No Indications Rescordable Indication Top Codes: M Scaing / Dusting Description Results Legend: Cracks (Characterize and Size) G Settlements or Deflections M Scaing / Dusting <td></td> | | | | |
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| Design Drawing(s) TAC 1-20:4 Visual Aids Bircculars Surface ID OD Surface / Components Coated: □ YES NO Matte Used Now2 Itest Card Utc or Serial Now2 Cal Due Date 20:4 Illumination Used Dischlight Illumination Verified: Date: 10:23-20:0 Time: 1300 Special / Specific Instructions: RESULTS Explanation / Notes Component / Item Number and Description RESULTS Explanation / Notes Component / Item Number and Description Recordable Indications as applicable; Bugnded growt PAtchs A Bugnded growt PAtches L oil Staix3 P Bug hole 3 Gomeral Area Couditions; Recordable Indication IO - Information Only Recordable Indication Type Codes; Recordable Indication Type Codes; No Coating Deterioration A. Cracks (Characterize and Size) Spails No Coating Deterioration C Exposed Meinforcing Steel I. Degraded Patches or Repairs No Coating Deterioration C Exposed Meinforcing Steel I. Degraded Patches or Repairs No Coating Deterioration C Exposed Meinforcing Steel I. Degraded Patches or Repairs <td>Exam Type: DV GV VT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Coverete</td> | Exam Type: DV GV VT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Coverete | | | |
| M&TE Used: Now Itest Card UTc or Serial No. N/L Cal. Due Date: N/L Illumination Used //kd/ight Illumination Verified: Date: /0.23-20/C Time /30/C Special / Specific Instructions: Component / Item Number and Description RESULTS Explanation / Notes Component / Item Number and Description NI RITYPE 10 (As a minimum, Record Location and Size of Recordable Indications as applicable) Butters NI RITYPE 10 (As a minimum, Record Location and Size of Recordable Indications as applicable) Butters NI RITYPE 10 (As a minimum, Recordable Indications as applicable) Butters NI RITYPE 10 (As a minimum, Recordable Indication Second Location and Size of Recordable Indication Second Location and Size of Recordable Indication Second Location and Size of Previously reported. No charge NI NI - No Indications Results Legend. NI - No Indications Recordable Indication Type Codes: Recordable Indication Type Codes: Scaling / Dusting B Exposed Metallic Items (Other) Populations, Voids, Honeycomb O Abrasion, Cavitation, Wear D Evidence Of Grease Leakage J. Spalls P A Cordable Indication Type Codes: Ne Cold Joint Lines O Ethroscence | Design Drawing(s) TMI 1-0014 Visual Aids: Binoculars | | | |
| Illumination Used Field is interventions: Illumination Verified: Date: 10.23-200 Time: 1300 Special / Specific Instructions: RESULTS Explanation / Notes Component / Item Number and Description RESULTS Explanation / Notes (e.g. EIN, EID, etc.) NI RI TYPE IO BotHress I A Smill Cracks Logaded grout AAtches L oil Staix3 P Bug hole's (Small) General Area Couditions Small Results Legend: NI - No Indications Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: No Change A. Cracks (Characterize and Size) J. Pervisous IV reported - No Change B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metain (Items (Other) Pologouts, Voids, Honeycomb O. Abrasion, Cavilation, Wear D. Evidence Of Grease Leakage J. Spalis P. Ar Voids / Bug Holes E. Evidence Of Misture K. Cold Joint Lines O. Efforescence F. Leacting Or Chemical Attack L. Corrosion Staining O. Other (Describe) Results. Acce | | | | |
| Special / Specific Instructions: RESULTS Explanation / Notes Component / Item Number and Description (e.g. EIN, EID, etc.) NI RI TYPE IO As a minimum, Record Location and Size of Recordable Indications as applicable) Buthress1 A Small cmcks H Degraded group AAtches L oil staix3 P Bug hole 3 Small General Area Cound + tows 5 NI NI No Indications Results Legend: No Charge NI No Indications RI - Recordable Indication 10 - Information Only Results Legend: No Charge Results Legend: NI No Indication Type Codes: No Charge No Charge A Cracks (Characterize and Size) G Settlements Or Deflections M. Scaling / Dusting B Exposed Reinforcing Steel H Degraded Patches or Repairs N. Coaling Deterioration D Evidence Of Grease Leakage J. Spalls P. No Voids Bug Holes Q. Efforescence E Evidence Of Mediai (times (Other) L. Corrosion Staining R. Calid Joint Lines Q. Efforescence F Leaching Or Chemical Atack L. Corrosion Staining R. Duer (Ex | | | | |
| Component / Item Number and Description (e.g. EIN, EID, etc.) RESULTS Explanation / Notes (As a minimum, Record Location and Size of Recordable Indications as applicable) BuffredSSI A Small cmcks BuffredSSI A Small cmcks L Digraded grout patches Digraded grout patches Bug hole 5 (Small) General Area Cound it ious 5 Proviously reported. No Churge NI - No Indications Results Legend. NI - No Indications G. Settlements or Deflections M. Cracks (Characterize and Size) G. Settlements or Deflections B. Exposed Reinforcing Steel H. Degraded Patches or Repairs D. Evidence Of Greas Leakage J. Spalis F. Leaching Or Chemical Attack L. Corrosins Staining Results: Acceptable Other (Explain) Supplemental Information Cless Mine Sign M. Racce Babling Nume Better Results: Acceptable LeVeL TO Unacceptable results Acceptable DATE Devidence Of Greas Leakage J. Spalis P. Leaching Or Chemical Attack L. Corrosion Staining R. Cold Joint Lines O. Efforescence R. Scategraphic Mine Patches <t< td=""><td></td></t<> | | | | |
| Description (e.g. EIN, EID, etc.) NI RI TYPE 10 (As a minimum, Record Location and Size of Recordable Indications as applicable) Buttress1 A Small cnacks A Small cnacks Bughded grout pAtchess L oil staiws Bugholes (Small) General Area Couditions Recordable Indication Staiws P Bugholes (Small) Recordable Indication Ideations Rit-Recordable Indication Type Codes: No Change A. Cracks (Characterize and Size) G Settlements or Deflections M Scaling / Dusting B. Exposed Reinforcing Steel H Pequaded Patches or Repairs N. Coaling Deterioration C. Exposed Reinforcing Steel H Pequaded Patches or Repairs N. Coaling Deterioration B. Exposed Reinforcing Steel H Pequaded Patches or Repairs N. Coaling Deterioration C. Exposed Meatilic Items (Other) I. Popouts. Voids, Honeycomb O. Abrasion. Cavitation. Wear D. Evidence Of Mosture K. Col Joint Lines O. Efforescence F. Leaching Orchemical Attack L. Corosion Staining Other (Exp | | | | |
| Buttressl A Small cncks H Degraded growt patchess L L oil staiws P Bug holes (Small) Geveral Area Cowditions Results Legend: NI-No Indications RI-Recordable Indication 10 - Information Only Resordable Indication Type Codes: A. Cracks (Characterize and Size) G Settlements Or Deflections M. Scaling / Dusting B. Exposed Metalic Hems (Other) I Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls Spalls P. Air Voids / Bug Holes E. Evidence Of Molsture K. Cold Joint Lines Q. Efforescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : [Yes [No Sketch [Photo Video Other (Explain) Supplemental Information Keview DATE ID-25-2010 Station NL Bance Bobbins N. Bance Bobbins N. Bance Bobbins DATE ID-25-2010 Station Request, Work Order, Issue Report, etc. initiated for Corrective Action; No No C. Carcose Results Acceptable Yes No No No Action Reque | Description NI RI TYPE IO (As a minimum, Record Location and Size of | | | |
| H Degraded grout pAtches L oil stains P Bug holes (Small) General Area Conditions Previously reported. No change NI-No Indications RI-Recordable Indication 10 - Information Only Recordable Indication Type Codes Recordable Indication Type Codes A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting B. Exposed Metalic Idems (Other) I. Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls O. Efflorescence E. Evidence Of Moisture K. Cold Joint Lines O. Efflorescence E. Evidence Of Moisture K. Cold Joint Lines O. Efflorescence E. Evidence Of Moisture K. Cold Joint Lines O. Efflorescence E. Evidence Of Moisture K. Cold Joint Lines O. Efflorescence E. Evidence Of Moisture K. Cold Joint Lines D. Efflorescence Results Acceptable MYes No Supplemental Information Yes No Sketch Photo EXAMINER/EVALUATOR Results Acceptable Yes No EXAMINER/EVALUATOR No Acceptable condition. Right N. | A Small cracks | | | |
| L oil stains P Bug holes (Small) General Area Conditions Results Legend NI-No Indications R1-Recordable Indication 10 - Information Only Recordable Indication Type Codes: No Change A. Cracks (Characterize and Size) G. Settlements Or Deflections B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metallic Items (Other) I. Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information :: [Yes [MNo] Sketch []Photo Other (Describe): Results: Acceptable M. Baue Moleca LEVEL ID DATE 10-25-20(0 Station/ADMIN REVIEW Evan Johnsen DATE 10/29 / 20(0 DATE 10/29 / 20(0 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable condition. RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes [] No No Mattactor Corrective Attion. | H Degraded grout patches | | | |
| P Bug holes (Small) General Area Couditions NI - No Indications R1-Recordable Indication Results Legend: No Change NI - No Indications R1-Recordable Indication Results Legend: No Change Results Legend: No Change Results Legend: No Change Results Legend: No Change Recordable Indication Type Codes: M. Scaling / Dusting Results Legend: No Coating Deterioration C Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C Exposed Metallic Items (Other) I. Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Wear D Evidence Of Grase Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : Yes No EXAMINER/EVALUATOR (Primt & Sign) K. Acceptable Yes No DATE STATION/ADMIN REVIEW Evan Johnsen DATE Mage Joo This section to be completed only if Examiner/Evaluator note | 1 pil stains | | | |
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| NI - No Indications R1 - Recordable Indication IO - Information Only Recordable Indication Type Codes: Recordable Indication Type Codes: A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metallic Items (Other) I. Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : [Yes [X]NO Sketch [Photo [Video] Other (Describe): Results: Acceptable [Yes]NO EXAMINER/EVALUATOR (Print & Sign) K. Rance Reboins M. Rever Roboins M. Reve | | | | |
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| D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : Yes XINO Sketch Photo Other (Describe): Results: Acceptable Yes No EXAMINER/EVALUATOR (Print & Sign) W. Rance Robbins W. Have Holes (Print & Sign) W. Rance Robbins W. Have Holes This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) LEVEL III or RE REVIEW (as applicable) ANUL DEVIEW. | | | | |
| E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : Yes No Sketch Photo Video Other (Describe): Results: Acceptable Yes No EXAMINER/EVALUATOR (Print & Sign) W. Rance Robbins W. Robbins | | | | |
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| Results: Acceptable Yes No EXAMINER/EVALUATOR (Print & Sign) W. Ravce Robbins W. | F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) | | | |
| EXAMINER/EVALUATOR (Print & Sign) W. Rance Robbins Robbins W. Rance Robbins | Supplemental Information : Yes XINO Sketch Photo Video Other (Describe): | | | |
| (Print & Sign) W, Rance Robbins W: Parce Policies LEVEL III DATE 10-25-2010 STATION/ADMIN REVIEW Even Johnson DATE 10/29/2010 (Print & Sign) Even Johnson DATE 10/29/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. DATE 10/29/2010 RI or Unacceptable results Acceptable Yes No No Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Howard Hill DATE: 29 OT/0 LEVEL III or RE REVIEW (as applicable) All additional All additional | | | | |
| STATION/ADMIN REVIEW EvanJohnsen DATE 10/29 /2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Yes No No CI Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) HowAre Hill DATE: 29 OT 10 LEVEL III or RE REVIEW (as applicable) Additional Actions Additional Actions | | | | |
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| RI or Unacceptable results Acceptable Yes No No RI Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) And Action Howard Hill DATE: 29 07/0 ANU REVIEW (as applicable) And Allacher Review Action | | | | |
| Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) / / //////////////////////////////// | This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | | | |
| Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) / / //////////////////////////////// | | | | |
| LEVEL III OF RE REVIEW (as applicable) And And HowARD HILL DATE: 29 0-10 | Additional Actions: | | | |
| ANULDENNEMI ON A RULAGE | (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | | |
| ANII REVIEW (as applicable) Jonesh lithing DATE: 11-4-10 | LEVEL III OF RE REVIEW (as applicable) / March All HOWARD HILL DATE: 29 OCT 10 | | | |
| | ANULDENTIENAL DATE IL H-10 | | | |
| Page of | | | | |

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ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Station: TMI Date: 10-19-2010 Unit: 1 Report No: System: Containment Component: Dome Area Tendon Trench WO No(s) .: R2139507 Building: Courtain ment Elev .: Col.: Row: Azimuth/Radius:235 % Location: Exam Type: DV GV VT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Concrete Design Drawing(s) TMT 1-0016 Visual Aids: None OD Surface / Components Coated: NO NO Surface: ID YES UTC or Serial No. N/A M&TE Used Freler Grace FE58 45-11 X Test Card Cal. Due Date: Illumination Used Spot Licht Illumination Verified: Date: 10-19-2010 Time: 0800 Special / Specific Instructions: RESULTS Component / Item Number and Explanation / Notes Description **RI TYPE** (As a minimum, Record Location and Size of NI 10 (e.g. EIN, EID, etc.) Recordable Indications as applicable) Dome Area Tendon Trench R Spall in french Wall, previously reported, repaired and stable. from V-113 to V-157 R Bearing plates with corrosion, previously reported, repaired and A Note: This VT-3C examis being done on detensioned And/or stable. replaced during the SGR. * NOTE: All conditions listedare as previously reported, NO change Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: Settlements Or Deflections Α. Cracks (Characterize and Size) G. M Scaling / Dusting Β. Exposed Reinforcing Steel Degraded Patches or Repairs **Coating Deterioration** Η. N. С. Exposed Metallic Items (Other) 1. Popouts, Voids, Honeycomb О. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage Spalls Р Air Voids / Bug Holes J. Ε. **Evidence Of Moisture** Κ. **Cold Joint Lines** Q. Efflorescence F. Leaching Or Chemical Attack **Corrosion Staining** Other (Explain) L. R. Supplemental Information : XYes No Sketch Photo Video Other (Describe): Results: Acceptable XYes No **EXAMINER/EVALUATOR** 71 LEVEL 10-19+2010 DATE (Print & Sign) W. RANCE Robbins STATION/ADMIN REVIEW 10/29/10 N30-DATE (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable T Yes No No RI Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action DATE: 29 Oct 10 HOWARD HILL) LEVEL III or RE REVIEW (as applicable) DATE: /1-4-0 ANII REVIEW (as applicable) Page of

Revision 5 Page 32 of 32



ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Date: 10-19-2010 Station: TM I Unit: 1 Report No: System: Tendons Component: Tendon Gallery Base MAT WO No(s) .: R2139507 Building: Containment Elev .: Azimuth/Radius:235 36 Col Row: Location: Exam Type: DV DV DV VT-1C XVT-3C Type Of Exam: XDirect Remote Matl. Type: Coverete Design Drawing(s) TMI 1-0016 Visual Aids: None Surface: ID (OD)Surface / Components Coated: X YES NO UTC or Serial No. N/A Cal. Due Date: N/A M&TE Used: Stal Scale S. S. S. S. Test Card Illumination Used Spot Lisht Illumination Verified: Date: 10-19-2010 Time: 0800 Special / Specific Instructions: Component / Item Number and RESULTS **Explanation / Notes** Description NI **RI TYPE** 10 (As a minimum, Record Location and Size of (e.g. EIN, EID, etc.) Recordable Indications as applicable) Tendon Gallery Base Mat stress cracks none > than .015" Efflorescence on inner and outer malls at base mate from V-113 to V-157. Degraded grout patches with exposed metal A Note: This VT-3C examis that apears to be Abaudoved trumpets A various locations between bearing plates and inner wall with active corrosion. being done on the tendens detensioned And/or replaced Exposed embed plate adjacent to V-113 Wachive corresion and pitting < than .010" deep. during the SGR. concrete surfaces coated with sealant N * Note: All conditions listed Are as previously reported, no change. Are peeling in Areas throughout gallery. **Results Legend:** NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: Α. Cracks (Characterize and Size) G. Settlements Or Deflections Μ. Scaling / Dusting Β. Exposed Reinforcing Steel Η. **Degraded Patches or Repairs Coating Deterioration** N. С. Exposed Metallic Items (Other) Popouts, Voids, Honeycomb Abrasion, Cavitation, Wear 1. О. D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes **Evidence Of Moisture Cold Joint Lines** Ε. Q. Κ. Efflorescence Leaching Or Chemical Attack **Corrosion Staining** F. R. Other (Explain) L. Supplemental Information : XYes No Sketch Rhoto Video Other (Describe): Results: Acceptable No XYes EXAMINER/EVALUATOR 71 DATE 10-19-12010 LEVEL (Print & Sign) W. RANCE Robbins STATION/ADMIN REVIEW 10/27/2010 DATE (Print & Sign) Johnson This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable 2 Yes No No NO RI Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Agtion HOWARD NICC) DATE: 29 OCT)O LEVEL III or RE REVIEW (as applicable) DATE: /1. 4-10 ANII REVIEW (as applicable) Page 1 of 2

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| ATTACHMENT 6 | |
|--|---|
| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report | |
| Page 1 of 1 | |
| Station: TMI Unit: 1 Date: 10 | -19-2010 Report No: |
| System Containment Component: Tendon Gallery Base | Mat WO No(s).: R2139507 |
| Location: Building: Containment Elev .: 0 | Col.: Row: Azimuth/Radius:235 25 |
| Exam Type: DV GV VT-1C XVT-3C Type Of | Exam: Direct Remote Matl. Type:Courte |
| | ids: Now |
| | / Components Coated: X YES NO |
| | Serial No. N/A Cal. Due Date: N/A |
| Illumination Used Sol Light Illum Special / Specific Instructions: | nination Verified: Date: 10-19-2010 Time: 0800 |
| Component / Item Number and RESULTS | Explanation / Notes |
| Description NI RI TYPE (e.g. EIN, EID, etc.) | IO (As a minimum, Record Location and Size of Recordable Indications as applicable) |
| Tendon Gallery BASE MAT | B Exposed rebar Adjacent to 1-143 |
| from V-113 to V-157 | B Exposed rebar adjacent to V-149 |
| #Note: This VT-3C exam is being | |
| done on the tendons detensi- | |
| - oned and/or replaced during | |
| the SGR. | |
| ANOte: All conditions listed are | |
| As previously reported, No change. | Legend: |
| NI - No Indications RI - Recordable Indication IO – Information Only | |
| A. Cracks (Characterize and Size) G. Settlements Or De | ation Type Codes: effections M. Scaling / Dusting |
| B. Exposed Reinforcing Steel H. Degraded Patches | |
| C. Exposed Metallic Items (Other) I. Popouts , Voids, H | loneycomb O. Abrasion, Cavitation, Wear |
| D.Evidence Of Grease LeakageJ.SpallsE.Evidence Of MoistureK.Cold Joint Lines | P. Air Voids / Bug Holes Q. Efflorescence |
| F. Leaching Or Chemical Attack L. Corrosion Staining | |
| Supplemental Information : XYes No Sketch X | Photo 🗍 Video 🗍 Other (Describe): |
| Results: Acceptable | XYes No |
| (Print & Sign) N. Rawee Robbins W. Romee Robbins | LEVEL DATE 18-19-2010 |
| (Print & Sign) Evan Johnson | DATE 10/29/10 |
| This section to be completed only if Examiner | /Evaluator notes RI or Unacceptable condition. |
| RI or Unacceptable results Acceptable | No ADD (I |
| Additional Actions: | |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Acti | |
| LEVEL III or RE REVIEW (as applicable) | (HOWARD HILL) DATE: 29000 10 |
| ANII REVIEW (as applicable) Jaseph Stub | DATE: 11-4-18 |
| Page 2 o | f <u>2</u> |

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| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE | | |
|--|--|--|
| | | |
| Report Page 1 of 1 | | |
| Station: TMT Unit: 1 Date: 10-22-2010 Report No: | | |
| System Tendows Component Containment building wall between buttress 5¢6WO No(s).: R2139507 | | |
| Landing Building of Level Ling Wall between Duriness 26600 Holding K2137301 | | |
| Location: Building: Containment Elev.: N/A Col.: N/A Row: N/A Azimuth/Radius: N/A Exam Type: DV GV VT-1C XVT-3C Type Of Exam: Direct XRemote Matl. Type: Concrete | | |
| Exam Type: DV GV VT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Concrete Design Drawing(s) TMT 1-0015 Visual Aids: Binoculars | | |
| Surface: ID (OD) Surface / Components Coated: YES X NO | | |
| M&TE Used: Nonc Test Card UTC or Serial No. N/A Cal. Due Date: N/A | | |
| Illumination Used Sun light e spotlight Illumination Verified: Date: 10-22-2010 Time: 1130 | | |
| Special / Specific Instructions: Explanation / Notes Component / Item Number and RESULTS Explanation / Notes | | |
| Description NI RI TYPE IO (As a minimum, Record Location and Size of | | |
| (e.g. EIN, EID, etc.) Recordable Indications as applicable) | | |
| Outer sufface of the containment A General Area conditions - shrukase crads | | |
| building wall between buttresses H < than .040", Degraded grout patches an Sand & Including SGR construct- | | |
| building wall between buttresses 5 and 6 Including SGR construct- -ion opening patch. * | | |
| H 3-Arcas with degraded grout partnes | | |
| between buttress 546 32 "below ring | | |
| girder, cold joint Adjacent to H5343 | | |
| 6" from the left side of buttress 5, and 2×5' Area 12' above the equipment | | |
| hatchenclosure are unchanged. | | |
| Results Legend: NI - No Indications RI - Recordable Indication IO – Information Only | | |
| Recordable Indication Type Codes: | | |
| A. Cracks (Characterize and Size) G: Settlements Or Deflections M. Scaling / Dusting | | |
| B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration C. Exposed Metallic Items (Other) I. Popouts , Voids, Honeycomb O. Abrasion, Cavitation, Wear | | |
| D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes | | |
| E. Evidence Of Moisture K. Cold Joint Lines Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) | | |
| F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain) Supplemental Information : Yes WNO Sketch Photo Video Other (Describe): | | |
| Results: Acceptable Ves No | | |
| EXAMINER/EVALUATOR (Print & Sign) W. RANCE Robbins LEVEL I DATE 10-22-2010 | | |
| (Print & Sign) DATE 10/29/2010 | | |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | | |
| RI or Unacceptable results Acceptable \Box Yes \Box No N_{0} RT | | |
| Additional Actions: | | |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) | | |
| LEVEL III OF RE REVIEW (as applicable) | | |
| ANII REVIEW (as applicable) Achesta Multig DATE: 11-4-10 | | |
| Page 1 of 2 | | |
| #See supplemental VT-12 exam of the SGR construction opening patch. | | |

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| ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE | |
|--|--|
| Report Page 1 of 1 | |
| Station: TMT Unit: 1 Date: 10-22-2010 Report No: | |
| System Tendon's Component: Containment building wall between buttresses 5 e 6 WO No(s) .: R2139507 | |
| Location: Building: Containment Elev.: N/A Col.: N/A Row: N/A Azimuth/Radius: N/A | |
| Exam Type: DV DV DVT-1C VVT-3C Type Of Exam: Direct Remote Matl. Type: Concrete | |
| Design Drawing(s) TMT 1-0015 Visual Aids: Binoculars Surface: ID (OD) Surface: ID (OD) | |
| M&TE Used: None State UTC or Serial No. N/4 Cal. Due Date: N/4 | |
| Illumination Used Swilight & Southight Illumination Verified: Date: 10-22-2010 Time: 1/30 | |
| Special / Specific Instructions: | |
| Component / Item Number and RESULTS Explanation / Notes | |
| Description NI RI TYPE IO (As a minimum, Record Location and Size of Recordable Indications as applicable) | |
| Cuter Surface of the containment, bilding C exposed embed Diates 4 "wide 2'from WAll between buttresses 5 \$ 6 Ieff side of buttress 5 and 2'from riskt Including SGR construction opening Ieff side of buttress 6 from the ring girder Datch: ** Gewn, have surface rust with no pitting Patch: ** And degraded grout patches 1. Unchanged Including SGR construction opening C Patch: ** And degraded grout patches 1. Unchanged Including SGR construction opening C And degraded grout patch. C C Abandoned 3.4" and log patch. C Abandoned 3.4" and log patch. K Rough finish and cold joint lines, at the top Int No Indications R1: Recordable Indication 10 - Information Only Recordable Indication Type Codes: M. Scaling / Dusting A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting B. Exposed Metallic Items (Other) I. Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes E. Evidence Of Grease Leakage | |
| Results: Acceptable Yes No EXAMINER/EVALUATOR Image: Comparison of the second s | |
| (Print & Sign) W. RANCE BODDINS W. KOMEL HOLD LEVEL I DATE 10-25-2010 STATION/ADMIN REVIEW | |
| (Print & Sign) Evan Johnson DATE 10/29/2010 | |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | |
| RI or Unacceptable results Acceptable Yes No NO CI | |
| Additional Actions: | |
| (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III or RE REVIEW (as applicable) | |
| | |
| ANII REVIEW (as applicable) Asher DATE: 11-4-10 | |
| * See note on page 2. Page 2 of 2 | |

ATTACHMENT 6

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ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1 Station: TMT Unit: Date: 10-22-2010 Report No: System: Containing Component: Containing with bldg, will -SGR coust. opening patch WO No(s) .: R2139507 Row: N/A Building: Containment Elev .: Col.: N/A Azimuth/Radius: "/A Location: Type Of Exam: Direct Exam Type: DV DV DV XVT-1C VT-3C Remote Matl. Type: Coverete Visual Aids: None Design Drawing(s) TML 1.0015 600 Surface / Components Coated: Surface: ID (OD) YESNOL NO Test Card UTC or Serial No. NA M&TE Used: Cal. Due Date: N/A Illumination Verified: Illumination Used Sunlight & Spotlight Date: /0-22-10 Time: //:30 Special / Specific Instructions: Component / Item Number and RESULTS Explanation / Notes Description (As a minimum, Record Location and Size of NI **RI TYPE** 10 (e.g. EIN, EID, etc.) Recordable Indications as applicable) SGR construction opening patch and joining concrete. Between buttress SEG. Abandoned 3/4" Anchorbott 1 foot from the left side, 3 down from the top C conver of the construction opening Artch Rough finish on the cold joint lines at the top of the const. opening patch K Rough finish on the grout patch at the bottom 1/3 of the construction peurograph. R * The patch is coated with cureing combound R t is transparentand does not limit the pam. **Results Legend:** NI - No Indications RI - Recordable Indication IO – Information Only Recordable Indication Type Codes: Settlements Or Deflections Cracks (Characterize and Size) G. Μ. Scaling / Dusting Α. Exposed Reinforcing Steel Degraded Patches or Repairs Н. **Coating Deterioration** Β. N. C. Exposed Metallic Items (Other) Popouts, Voids, Honeycomb Ο. Abrasion, Cavitation, Wear 1. Evidence Of Grease Leakage D. J. Spalls Ρ. Air Voids / Bug Holes Evidence Of Moisture **Cold Joint Lines** E. Κ. Q. Efflorescence F. Leaching Or Chemical Attack L. Corrosion Staining Other (Explain) R. Supplemental Information : Yes No Sketch Photo Video Other (Describe): **Results:** Acceptable **K**Yes □No EXAMINER/EVALUATOR I LEVEL DATE 10-25-10 (Print & Sign) N. RANCE Robbins STATION/ADMIN REVIEW Eva DATE 10/29/10 (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. **RI or Unacceptable results Acceptable** T Yes **No** 10 ((I Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action LEVEL III or RE REVIEW (as applicable) OWAND DATE: 11-4-14 ANII REVIEW (as applicable) Page 1 of 2 Topical Report 204 Revion 0 Attachment 8.7 Page 522 of 523

ATTACHMENT 6

