TM-N1043-500 Appendix B Revision 0, Page 1 of 24



SUBURBAN LABORATORIES, Inc.

4140 Litt Drive · Hillside, Illinois 60162-1183. Tel. (708) 544-3260 · Toll Free (800) 783-LABS · Fax (708) 544-8587 www.SuburbanLabs.com



November 13, 2009

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

Tel: (219) 397-5826 Fax: (219) 397-5867

WorkOrder # 09101230

Project Name: PO 1026

Dear Gerald Bussone:

Suburban Laboratories, Inc. received 21 sample(s) on 10/26/09 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 including, 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 your customer service representative at (708) 544-3260.

Sincerely,

Nelissa Amador

Melissa Amador Project Manager

cc:

10000	PSC
	Q.A. REVIEWED
	BY: AlBussone
TOP LOD PARTY	DATE: 11/13/09

TM-N1043-500 Appendix B Revision 0, Page 2 of 24



Suburban Laboratories, Inc.

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

CASE NARRATIVE

Client ID:Rrecision Surveillance Corp.Date:November 13, 2009Project Name:PO 1026PO #:1026Lab Order:09101230QC Level:Level ITemperature of samples upon receipt in our Lab:°CChain of Custody #

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.

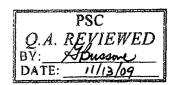
- E: USEPA Reference methods

- 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

Project Specific Comments: This report supersedes the report dated 11/11/09.





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Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: D-122 S/E Butt 5

Lab ID: 09101230-01

Date Received: 10/26/2009 12:00 AM

Matrix: GREASE Collection Date: 10/23/2009 12:00 AM

Report Date: November 13, 2009

Lab Order: 09101230

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1.	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analysi: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	2.79	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: D-225 F/E Butt 2

Lab 1D: 09101230-02 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	C	0.50	ppm.	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	С	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	С	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analysi: TS	
Base Number	52.0	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analysi: TS	
Sulfide	< 0.500	с	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC O.A. REVIEWED BY: DATE

Qualifiers:

BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation с
- G Refer to case narrative page for specific comments J
- Analyte detected below quantitation limit (QL)
- ND Not Detected at the SLI Reporting Limit
- В Analyte detected in the associated Method Blank
- Е Estimated, analyte detected above quantitation range
- Н Holding times for preparation or analysis exceeded
 - NA Not Applicable
- Internal standard recovery is outside SLI in-house criteria 0 (no method specific requirements exist)



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Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample 1D: D-225 S/E Butt 5

Lab ID: 09101230-03 Date Received: 10/26/2009 12:00 AM Report Date: November 13, 2009

Lab Order: 09101230

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Laboratory Results

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	C	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0:10	Ċ	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	37.3	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev. 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С.	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: D-342 F/E Butt 4

Lab ID: 09101230-04 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	C,	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	4.94	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC BY DATE

Qualifiers: BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- С

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

- В Analyte detected in the associated Method Blank.
- E Estimated, analyte detected above quantitation range
- Н Holding times for preparation or analysis exceeded
- ŇĂ Not Applicable
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)

Rpt Ver ID: 11/13/09 8:29:35 AM Melissa

Page 4 of 14



4140 Litt Drive, Hillside, 1L 60162 (708) 544-3260

Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: D-342 S/E Butt 6

Lab ID: 09101230-05 Date Received: 10/26/2009 12:00 AM

Lab Order: 09101230

Report Date: November 13, 2009

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	С	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	С	0.50	opm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	1.67	С	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	C.	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: H13-41 F/E Butt 3

Lab ID: 09101230-06 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM	•		Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	Ç	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	0.570	С	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA		Method: APHA-427C-Rev 15th-ed.				Analyst: TS	
Sulfide	< 0.500	с	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC EVIEWED 0.A. R BY DATE

Qualifiers: BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- c Analyte not included in SLI scope of accreditation
 - G Refer to case narrative page for specific comments
 - J Analyte detected below quantitation limit (QL)
 - ND Not Detected at the SLI Reporting Limit

- B Analyte detected in the associated Method Blank
- E Estimated, analyte detected above quantitation range
- H Holding times for preparation or analysis exceeded
- NA Not Applicable
- Q Internal standard recovery is outside SLI in-house criteria (no method specific requirements exist)



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Laboratory Results

Date Received: 10/26/2009 12:00 AM

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: H24-33 F/E Butt 2

Lab ID: 09101230-07

Report Date: November 13, 2009 Lab Order: 09101230

Matrix: GREASE Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-C	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analysi: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	С	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	2.23	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: H24-33 S/E Butt 4

Lab ID: 09101230-08 Date Received: 10/26/2009 12:00 AM-

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rey 1981		Analysi: TS	
Chloride	< 0.50	c	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Melhod: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	С	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	< 0.500	с	0.500	mg KOH/ģ	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC I.A. RE DATE

Qualifiers:

- BaseReport-Centinuous2004
- Value exceeds Maximum Contaminant Level Analyte not included in SLI scope of accreditation
- ¢ G Refer to case narrative page for specific comments
 - Analyte detected below quantitation limit (QL)
- J ND Not Detected at the SLI Reporting Limit
- В Analyte detected in the associated Method Blank
- Estimated, analyte detected above quantitation range Ε
- Holding times for preparation or analysis exceeded Н
- NA Not Applicable
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)

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Page 6 of 14



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

Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: H46-50 F/E Butt 4

Lab ID: 09101230-09

Date Received: 10/26/2009 12:00 AM

Collection Date: 10/23/2009 12:00 AM

Report Date: November 13, 2009

Lab Order: 09101230

Matrix: GREASE

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D)512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	0.20	c	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Melhod: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	2.51	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-4	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	C	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: H46-50 S/E Butt 6

Lab 1D: 09101230-10 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analysi: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	0.58	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	С	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	2.21	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-4	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	C	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC DATE

Qualifiers:

BaseReport Continuous2004

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation с G Refer to case narrative page for specific comments
 - Analyte detected below quantitation limit (QL)
- J Not Detected at the SLI Reporting Limit ND
- Analyte detected in the associated Method Blank в
- Е Estimated, analyte detected above quantitation range
- Н Holding times for preparation or analysis exceeded
- Not Applicable NA
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)

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

Client ID: Precision Surveillance Corp.

Laboratory Results

Report Date: November 13, 2009 Lab Order: 09101230

Matrix: GREASE

Project Name: PO 1026

Client Sample ID: H51-49 F/E Butt 5

Lab ID: 09101230-11

Date Received: 10/26/2009 12:00 AM

Collection Date: 10/23/2009 12:00 AM

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Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	С	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1967		Analyst: TS	
Base Number	1.12	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	Ċ	0,500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: H62-26 F/E Butt 2

Lab ID: 09101230-12 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	0.15	С	Ô. 10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	34.7	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	с	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC Q.A. REVIEWED BY: DATE

Qualifiers:

BaseReport-Continuous2004 С

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation G Refer to case narrative page for specific comments
 - Analyte detected below: quantitation limit (QL)
- J ND Not Detected at the SLI Reporting Limit
- В Analyte detected in the associated Method Blank
- E Estimated, analyte detected above quantitation range
- Holding times for preparation or analysis exceeded Н
- NA Not Applicable
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)



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Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: H62-26 S/E Butt 6

Lab ID: 09101230-13

Report Date: November 13, 2009

Lab Order: 09101230 Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM	· · · · · · · · · · · · · · · · · · ·		Method: ASTM-D	512-8 i-Rev 1981		Analyst: TS	
Chloride	< 0.50	c	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	c	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	C	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	44.6	Ç	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0,500	с	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Date Received: 10/26/2009 12:00 AM

Client Sample ID: V-11 Shop/Top Butt 1

Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Lab ID: 09101230-14 Collection Date: 10/23/2009 12:00 AM Report Dilution **Date Analyzed** Parameter Result Qual. Limit Units Factor **Batch ID** CHLORIDE BY ASTM Method: ASTM-D512-81-Rev 1981 Analyst: TS Chloride < 0.50 С 0.50 ppm 1 11/10/2009 12:00 AM R86217 Method: ASTM-D95-70-Rev 1970 MOISTURE BY ASTM Analýst: LL Moisture Content 0.21 0.10 wt% 11/04/2009 12:00 AM R86141 С 1 Method: ASTM-D992-78-Rev 1978 NITRATE BY ASTM Analyst: TS Nitrate < 0.50 0.50 11/10/2009 12:00 AM R86233 ppm 1 С **NEUTRALIZATION NUMBER BY ASTM** Method: ASTM-D974-87-Rev 1987 Analyst: TS Base Number 31.9 C 0.500 mg KOH/g 1 11/06/2009 12:00 AM R86165 SULFIDE BY APHA Method: APHA-427C-Rev 15th-ed. Analyst: TS Sulfide < 0.500 0.500 1 11/09/2009 10:00 AM R86195 С ppm

PSC Q.A.RBY: DATE:

Qualifiers:

BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- с Analyte not included in SLI scope of accreditation
- G Refer to case narrative page for specific comments
- J Analyte detected below quantitation limit (QL)
- Not Detected at the SLI Reporting Limit ND

- В Analyte detected in the associated Method Blank
- Ε Estimated, analyte detected above quantitation range
- Holding times for preparation or analysis exceeded Н
- NA Not Applicable
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)



Laboratory Results

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

Suburban Laboratories, Inc.

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: V-11 Bottom Field End

Lab ID: 09101230-15 Date Received: 10/26/2009 12:00 AM Report Date: November 13, 2009 Lab Order: 09101230

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed.	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	С	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Me!hod: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	1.40	С	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	с	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: V-132 Bottom Field End

Lab ID: 09101230-16 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM Report Dilution Qual. Limit. Factor **Batch ID** Parameter Result Units **Date Analyzed** Method: ASTM-D512-81-Rev 1981 CHLORIDE BY ASTM Analyst: TS Chloride < 0.50 С 0.50 ppm 11/10/2009 12:00 AM R86217 1 MOISTURE BY ASTM Method: ASTM-D95-70-Rev 1970 Analyst: LL Moisture Content < 0.10 R86141 0.10 wi% 1 11/04/2009 12:00 AM С NITRATE BY ASTM Method: ASTM-D992-78-Rev 1978 Analyst: TS < 0.50 11/10/2009 12:00 AM R86233 Nitrate с 0.50 ppm 1 Method: ASTM-D974-87-Rev 1987 Analyst: TS **NEUTRALIZATION NUMBER BY ASTM** Base Number 5.11 Ċ 0.500 mg KOH/g 1 11/06/2009 12:00 AM R86165 SULFIDE BY APHA Method: APHA-427C-Rev 15Ih-ed. Analyst: TS Sulfide < 0.500 0.500 11/09/2009 10:00 AM R86195 С ppm 1

PSC BY DATE

Qualifiers:

- BaseReport-Continuous2004
- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation С
- G Refer to case narrative page for specific comments
- Analyte detected below quantitation limit (QL) J
- ND Not Detected at the SLI Reporting Limit

- Analyte detected in the associated Method Blank В
- E Estimated, analyte detected above quantitation range
- H Holding times for preparation or analysis exceeded

NA Not Applicable

Q Internal standard recovery is outside SLI in-house criteria (no method specific requirements exist)



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

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Laboratory Results

Collection Date: 10/23/2009 12:00 AM

Report Date: November 13, 2009

Lab Order: 09101230

Matrix: GREASE

Client Sample ID: V-132 Top/Shop Shop End

Lab ID: 09101230-17 Date Received: 10/26/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method; ASTM-C	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	0.30	÷C	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-73-Rev 1976		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Methcd: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base, Number	46.8	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	Ç	0.500	ppm	· 1	11/09/2009 10:00 AM	R86195

Client Sample ID: V-32 Shop/Top Butt 2

Lab JD: 09101230-18

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM Date Received: 10/26/2009 12:00 AM Dilution Report Factor Limit **Batch ID** Parameter Result Qual. Units **Date Analyzed** CHLORIDE BY ASTM Method: ASTM-D512-81-Rev 1981 Analyst: TS Chloride < 0.50 0.50 11/10/2009 12:00 AM R86217 С 1 ppm MOISTURE BY ASTM Method: ASTM-D95-70-Rev 1970 Analyst: LL Moisture Content < 0.10 С 0.10 wt% 1 11/04/2009 12:00 AM R86141 NITRATE BY ASTM Method: ASTM-D992-78-Rev 1978 Analyst: TS 11/10/2009 12:00 AM R86233 Nitrate < 0.50 0.50 ppm 1 ¢ Method: ASTM-D974-87-Rev 1987 **NEUTRALIZATION NUMBER BY ASTM** Analyst: TS Base Number 0.500 mg KOH/g 11/06/2009 12:00 AM R86165 50.6 ċ 1 SULFIDE BY APHA Method: APHA-427C-Rev 15th-ed. Analyst: TS Sulfide 0.500 11/09/2009 10:00 AM < 0.500 1 R86195 С ppm

PSC DATE

Qualifiers:

BaseReport Continuous2004

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation с
- G Refer to case narrative page for specific comments J Analyte detected below quantitation limit (QL)
- ND Not Detected at the SLI Reporting Limit

- В Analyte detected in the associated Method Blank
- Estimated, analyte detected above quantitation range Ε
- Holding times for preparation or analysis exceeded Н

Not Applicable NA

Internal standard recovery is outside SLI in-house criteria 0 (no method specific requirements exist)



Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: V-32 Bottom Field End

Lab ID: 09101230-19 Date Received: 10/26/2009 12:00 AM

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

Lab Order: 09101230

Report Date: November 13, 2009

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	· ·
Chlorida	< 0.50	c	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	0.48	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	. C	0.50	ppm	´1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev. 1987		Analyst: TS	
Base Number	39.7	c	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	°C	0.500	ppm	1	11/09/2009 10:00 AM	R86195

Client Sample ID: V-90 Top/Shop Butt 4

Lab ID: 09101230-20 Date Received: 10/26/2009 12:00 AM

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	c	0.50	ppin	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	0.50	C	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	2.82	c	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	7C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC Bγ DATE

Qualifiers:

BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation c
- G Refer to case narrative page for specific comments
- Analyte detected below quantitation limit (QL) J
- ND Not Detected at the SLI Reporting Limit

- Analyte detected in the associated Method Blank В
- Estimated, analyte detected above quantitation range E
- Н Holding times for preparation or analysis exceeded
- Not Applicable NA
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)



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

Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO 1026

Client Sample ID: V-90 Bottom Field End

Lab ID: 09101230-21 Date Received: 10/26/2009 12:00 AM

Lab Order: 09101230

Report Date: November 13, 2009

Matrix: GREASE

Collection Date: 10/23/2009 12:00 AM

Parameter	Result	Qual.	Report Limit.	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-C	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86217
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	11/04/2009 12:00 AM	R86141
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	11/10/2009 12:00 AM	R86233
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	3.43	с	0.500	mg KOH/g	1	11/06/2009 12:00 AM	R86165
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	C	0.500	ppm	1	11/09/2009 10:00 AM	R86195

PSC Q.A.ĐΥ DATE

Qualifiers:

BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- c Analyte not included in SL1 scope of accreditation
- G Refer to case narrative page for specific comments
- J Analyte detected below quantitation limit (QL)
- ND Not Detected at the SLI Reporting Limit

- B Analyte detected in the associated Method Blank
- E Estimated, analyte detected above quantitation range
- H Holding times for preparation or analysis exceeded

NA Not Applicable

Q Internal standard recovery is outside SLI in-house criteria (no method specific requirements exist)

TM-N1043-500 Appendix B Revision 0, Page 14 of 24

Precision Surveillance Corporation

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



561 \$0910-1230

October 23, 2009

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

Attention Melissa Amador,

Please test the following twenty one (21) grease samples per PSC-P.O. # 1026.

	A (
D-122	S/E	Butt. 5
D-225	F/E	Butt. 2
D-225	S/E	Butt. 5
D-342	F/E	Butt. 4
D-342	S/E	Butt. 6
H13-41	F/E	Butt. 3
H24-33	F/E	Butt. 2
H24-33	S/E	Butt: 4
H46-50	F/E	Butt. 4
H46-50	S/E	Butt. 6
H51-49	F/E	Butt. 5
H62-26	F/E	Butt. 2
H62-26	S/E	Butt. 6
V-11	Shop/Top	Butt. 1
V-11	Bottom	Field End
V-132	Bottom	Field End
V-132	Top/Shop	Shop End
V-32	Shop/Top	Butt. 2
V-32	Bottom	Field End
V-90	Top/Shop	Butt. 4
V-90	Bottom	Field End

Record? 10/20/09 9:00 Am 19:00 Am

X

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 10/23/09.

Thank you,

Steadel Bussone

Gerald Bussone PSC/QA

TM-N1043-500 Appendix B Revision 0, Page 15 of 24



SUBURBAN LABORATORIES, Inc.

4140 Litt Drive · Hilfside, Illinois 60162-1183 Tel. (708) 544-3260 · Toll Free (800) 783-LABS · Fax (708) 544-8587 www.SuburbanLabs.com



December 23, 2009

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

Tel: (219) 397-5826 Fax: (219) 397-5867

WorkOrder # 09120292

Project Name: PO# 1031

Dear Gerald Bussone:

Suburban Laboratories, Inc. received 5 sample(s) on 12/04/09 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 including, 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 your customer service representative at (708) 544-3260.

Sincerely,

Melissa Amador

Melissa Amador Project Manager

cc:

	PSC	
Q.A.	REVIEWED	
BY:	Apussone	
DATE!	1/12/10	

TM-N1043-500 Appendix B Revision 0, Page 16 of 24



Suburban Laboratories, Inc.

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

CASE NARRATIVE

Client ID: Precision Surveillance Corp. Date: December 23, 2009 Project Name: PO# 1031 PO #: 1031 QC Level: Level I Lab Order: 09120292 Temperature of samples upon receipt in our Lab: 13 °C Chain of Custody #

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.

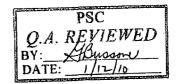
- E: USEPA Reference methods

- 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

Project Specific Comments:





Suburban Laboratories, Inc.

4140 Litt Drive, Hillside, 1L 60162 (708) 544-3260

Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO# 1031

Client Sample ID: D-122 FIELD N/E

Lab Order: 09120292 Matrix: GREASE

Report Date: December 23, 2009

Lab ID: 09120292-01	Date Receiv	/ed: 12/0	4/2009 10:00	АМ	Collecti	Collection Date: 12/03/2009 12:00 AM			
Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID		
CHLORIDE BY ASTM Chloride	< 0.50	с	Method: ASTM-I 0.50	D512-81-Rev 1981 ppm	1	Analyst: TS 12/22/2009 3:00 PM	R87254		
MOISTURE BY ASTM Moisture Content	< 0.10	С	Method: ASTM-0 0.10	D95-70-Rev 1970 wt%	1	Analyst: LL 09/10/2009 3:15 PM	R86992		
NITRATE BY ASTM Nitrate	< 0.50	С	Method: ASTM-0 ,0.50	0992-78-Rev 1978 ppm	1	Analyst: TS 12/22/2009 12:05 PM	R87258		
NEUTRALIZATION NUMBER BY ASTM Base Number	55.0	с	Method: ASTM-D 0.500	0974-87-Rev 1987 mg⊣KOH/g	1	Análysi: TS 12/22/2009 11:00 AM	R87257		
SULFIDE BY APHA Sulfide	< 0.500	с	Method: APHA-4 0.500	27C-Rev 15lh-ed. ppni	1	Analyst: TS 12/22/2009 2:00 PM	R87245		

Client Sample ID: H51-49 SHOP BUTT. 1

Lab ID: 09120292-02 Date Received: 12/04/2009 10:00 AM

Matrix: GREASE

Collection Date: 12/03/2009 12:00 AM Report Dilution Result Qual. Parameter Limit Units Factor **Date Analyzed** Batch ID CHLORIDE BY ASTM Method: ASTM-D512-81-Rev 1981 Analyst: TS ppm Chloride < 0.50 С 0.50 1 12/22/2009 3:00 PM R87254 MOISTURE BY ASTM Method: ASTM-D95-70-Rev 1970 Analyst: LL Moisture Content < 0.10 с 0.10 wt% 1 09/10/2009 3:15 PM R86992 Method: ASTM-D992-78-Rev 1978 Analyst: TS NITRATE BY ASTM Nitrate < 0.50 ppm 12/22/2009 12:05 PM R87258 0.50 1 С NEUTRALIZATION NUMBER BY ASTM Method: ASTM-D974-87-Rev 1987 Analyst: TS Base Number <:0:500 mg KOH/g 12/22/2009 11:00 AM R87257 ¢ 0.500 1 SULFIDE BY APHA Method: APHA-427C-Rev 15th-ed. Analyst: TS Sulfide < 0.500 0.500 1 12/22/2009 2:00 PM R87245 ¢ ppm

PSC EWDATE

Qualifiers: BaseReport-Continuous2004 с

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation
 - G Refer to case narrative page for specific comments J
 - Analyte detected below quantitation limit (QL)
 - ND Not Detected at the SLI Reporting Limit

- В Analyte detected in the associated Method Blank
- Е Estimated, analyte detected above quantitation range
- Н Holding times for preparation or analysis exceeded
- NA Not Applicable
- 0 Internal standard recovery is outside SLI in-house criteria (no method specific requirements exist)



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

Laboratory Results

Client ID: Precision Surveillance Corp.

Project Name: PO# 1031

Client Sample ID: H13-41 SHOP BUTT. 1

Lab ID: 09120292-03

Date Received: 12/04/2009 10:00 AM

Report Date: December 23, 2009 Lab Order: 09120292

Matrix: GREASE Collection Date: 12/03/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-C)512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	C .	0.50	ppm	1	12/22/2009 3:00 PM	R87254
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	С	0.10	wt%	1	09/10/2009 3:15 PM	R86992
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	12/22/2009 12:05 PM	R87258
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM D	974-87-Rev 1987		Analyst: TS	
Base Number	< 0.500	с	0.500	mg KOH/g	1	12/22/2009 11:00 AM	R87257
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	С	0.500	ppm	1	12/22/2009 2:00 PM	R87245

Client Sample ID: D-322 FIELD SOUTH

Lab ID: 09120292-04 Date Received: 12/04/2009 10:00 AM

Matrix: GREASE

Collection Date: 12/03/2009 12:00 AM

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM			Method: ASTM-D	512-81-Rev 1981		Analyst: TS	
Chloride	< 0.50	с	0.50	ppm	1	12/22/2009 3:00 PM	R87254
MOISTURE BY ASTM			Method: ASTM-D	95-70-Rev 1970		Analyst: LL	
Moisture Content	< 0.10	с	0.10	wt%	1	09/10/2009 3:15 PM	R86992
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analyst: TS	
Nitrate	< 0.50	с	0.50	ppm	1	12/22/2009 12:05 PM	R87258
NEUTRALIZATION NUMBER BY ASTM			Method: ASTM-D	974-87-Rev 1987		Analyst: TS	
Base Number	0.810	с	0.500	mg KOH/g	1	12/22/2009 11:00 AM	R87257
SULFIDE BY APHA			Method: APHA-42	27C-Rev 15th-ed.		Analyst: TS	
Sulfide	< 0.500	c	0.500	ppm	1	12/22/2009 2:00 PM	R87245

PSC Q.A. REV BY: DATE

Qualifiers: BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- Analyte not included in SLI scope of accreditation ¢
 - G Refer to case narrative page for specific comments J
 - Analyte detected below quantitation limit (QL)
 - ND Not Detected at the SLI Reporting Limit

- B Analyte detected in the associated Method Blank
- Е Estimated, analyte detected above quantitation range
- Holding times for preparation or analysis exceeded Н
- Not Applicable NA
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)

*

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Suburban Laboratories, Inc.

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

Laboratory Results

Client ID: Precision Surveillance Corp. Project Name: PO# 1031

Client Sample ID: D-322 SHOP NORTH

Lab ID: 09120292-05 Date Received: 12/04/2009 10:00 AM Report Date: December 23, 2009 Lab Order: 09120292

Matrix: GREASE

Collection Date: 12/03/2009 12:00 AM.

Parameter	Result	Qual.	Report Limit	Units	Dilution Factor	Date Analyzed	Batch ID
CHLORIDE BY ASTM Chloride	فلو بجوزة الابرانين التسرأ كالكالي		Method: ASTM-C	0512-81-Rev 1981		Analyst: TS	
	< 0.50	С	0.50	ppm	1	12/22/2009 3:00 PM	R87 254
MOISTURE BY ASTM Moisture Content			Method: ASTM-D	95-70-Rev 1970		Analysi: LL	
	< 0.10	С	0.10	wt%	1	09/10/2009 3:15 PM	R86 992
NITRATE BY ASTM			Method: ASTM-D	992-78-Rev 1978		Analysi: TS	
Nitrate	< 0.50	С	0.50	ppm	1	12/22/2009 12:05 PM	R87 258
NEUTRALIZATION NUMBER BY ASTM Base Number			Method: ASTM-D	974-87-Rev 1987		Analysi: TS	207017
	< 0.500	С	0.500	mg KOH/g	1	12/22/2009 11:00 AM	R87257
SULFIDE BY APHA Sulfide			Mèlhód: APHA-42	27C-Rev 15th-cd.		Analyst: TS	
Sunide	< 0.500	C	0.500	ppm	1	12/22/2009 2:00 FM	R87245

PSC Q.A. ВY DATE

Qualifiers:

BaseReport-Continuous2004

- Value exceeds Maximum Contaminant Level
- С Analyte not included in SLI scope of accreditation
- G Refer to case narrative page for specific comments J
 - Analyte detected below quantitation limit (QL)
- ND Not Detected at the SLI Reporting Limit
- В Analyte detected in the associated Method Blank
- E Estimated, analyte detected above quantitation range
- Н Holding times for preparation or analysis exceeded
- NA Not Applicable
- Internal standard recovery is outside SLI in-house criteria Q (no method specific requirements exist)

ORDERED BY:

PRECISION SURVEILLANCE CORPORATION

3468 WATLING ROAD EAST CHICAGO, IN 46312-1709 USA

PURCHASE ORDER Purchase Order No.: 1031

Date Issued: 12/3/09

Volce: 219-397-5826 Fax: 219-397-5867

SUBURBAN LABORATORIES INC PRECISION SURVEILLANCE CORPORATION 4140 LITT DRIVE 3468 WATLING ROAD HILLSIDE, IL 60162-1183 EAST CHICAGO, IN 46312-1709 USA 1/2/10 BEST WAY Net 30 Days Test grease samples (5) samples to requirements in attached letter dated December 3, 2009. Test for water soluble chlorides, nitrates, and sulfides, water content and neutralization number as per letter requirements. Provide results to PSC QA Department. All provisions of the Suburban Quality Assurance Plan, Rev. 9, dated 9/1/07 apply to the contracted services herein. Suburban shall submit a laboratory report indicating the results of the tests were in conformance with the requirements of this Purchase Order. A member of Suburban's QA Department shall authenticate the laboratory results. PSC, including authorized Clients and Contractors shall have right-of-access to the Suburban facility for the purposes of record review, and/or audit or surveillance activities. Suburban shall report any defects or nonconforming conditions from the Purchase Order requirements to the PSC Quality Department prior to completion of this Purchase Order to determine acceptability. Test reports will include the Test Method used (including year).

Authorized Signature

HBusene for Paul Smith



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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

March 18, 2010

Workorder: 1003279

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

TEL: (219) 975-5826 FAX: (219) 975-5867 RE: PO# 1054

Dear Gerald Bussone:

Suburban Laboratories, Inc. received 4 sample(s) on 03/08/10 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.

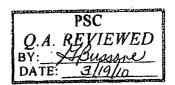
This final report of laboratory analysis consists of this cover letter, case narrative, analytical report, dates report, and any accompanying documentation on, but not limited to, chain of custody records, raw data, and letters of explanation or reliance. This report may not be reproduced, except in 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,

Millina Amedor

Melissa Amador Project Manager



Illinois Department of Public Health Accredited # 17585



Illinois Environmental Protection Agency Accredited #100225



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Suburban Laboratories, Inc.

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

Case Narrative

Date: March 18, 2010

PO #: 1054

QC Level: LEVEL I

Chain of Custody #: 1054

Client:	Precision Surveillance Corp.
Project:	PÖ# 1054
WorkOrder:	1003279

Temperature of samples upon receipt at SLI: 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.

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

- 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.

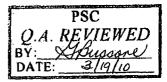
- E: USEPA Reference methods

- 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:





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

Client ID: Precision Surveillance Corp.

Laboratory Results

Report Date: March 18, 2010 Lab Order: 1003279

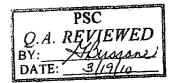
Project Name: PO# 1054 Client Sample ID: H13-41 SHOP/BT1

Matrix: GREASE

Lab ID: 1003279-001 Date Received: 03/08/2010 9:40 AM

Collection Date: 03/04/2010 12:00 AM

		Report			Dilution	1	
Parameter	Result	Limit	Qual.	Units	Factor	Date Analyzed	Batch ID
ACID NUMBER BY ASTM		Method: A	STM-0974 n	nodified-Rev 199	7	Analyst: to	
Acid Number	< 0.500	0.500		mg KOH/g	1	03/17/2010 11:00 AM	R531
Client Sample ID: H24-33 SI	IOP/BT4			Ν	Aatrix: C	REASE	
Lab ID: 1003279-002	Date Received: 03/	08/2010 9:40 AM		Collection	n Date: 0	3/04/2010 12:00 AM	
		Report			Dilutior	1	
Parameter	Result	Limit	Qual.	Units	Factor	Date Analyzed	Batch ID
ACID NUMBER BY ASTM		Method: AS	STM-D974 m	nodified-Rev 1997	<i>į</i> .	Analyst: ts	
Acid Number	< 0.500	0.500		mg KOH/g	1	03/17/2010 11:00 AM	R531
Client Sample ID: H51-49 SF	IOP/BTI			N	latrix: G	REASE	
Lab ID: 1003279-003	Date Received: 03/	08/2010 9:40 AM		Collection	Date: 0	3/04/2010 12:00 AM	
		Report			Dilution	I	
Parameter	Result	Limit	Qual.	Units	Factor	Date Analyzed	Batch ID
ACID NUMBER BY ASTM		Method: AS	TM-D974 m	odified-Rev 1997	,	Analyst: Is	ليتعييرا بلانات فليتبين الأنساد بسبي
Acid Number	< 0.500	0.500		mg KOH/g	1	03/17/2010 11:00 AM	R531
Client Sample ID: D-322 SHO	DP/N			M	latrix: G	REASE	
Lab 1D: 1003279-004	Date Received: 03/0	08/2010-9:40 AM		Collection	Date: 03	3/04/2010 12:00 AM	
		Report			Dilution		
Parameter	Result	Limit	Qual.	Units	Factor	Date Analyzed	Batch ID
ACID NUMBER BY ASTM		Method: AS	TM-D974 m	odified-Rev 1997		Analysi: Is	
Acid Number	< 0.500	0.500		mg KOH/g	1	03/17/2010 11:00 AM	R531



Qualifiers: ۰, Value exceeds Maximum Contaminant Level В Analyte detected in the associated Method Blank Е Estimated, detected above quantitation range Analyte not in SLI scope of accreditation С Holding times for preparation or analysis exceeded G Refer to case narrative page for specific comments н J Analyte detected below quantitation limit (QL) Ν Tentatively identified compounds ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits **ORDERED BY:**

PRECISION SURVEILLANCE CORPORATION 3488 WATLING ROAD EAST CHICAGO, IN 46312-1709 USA

Voice: 219-397-5828 Fax: 219-397-5867

SUBURBAN LABORATORIES INC 4140 LITT DRIVE HILLSIDE, IL .80162-1183

PURCHASE ORDER Purchase Order No.: 1054

Date Issued: 3/4/10

Rectived 318/10 9 10 AM THA WO# 1003279

PRECISION SURVEILLANCE CORPORATION 3468 WATLING ROAD EAST CHICAGO, IN 46312-1709 USA

4/3/10	BEST WAY			Net 30 Days	
D-3 AST All p coni Sub coni A m <i>inclu</i> to th activ cond to cond	22 Shop/N for neutralization M D974 Modified. Provide rovisions of the Suburban racted services herein. urban shall submit a labora ormance with the requirem amber of Suburban's QA D ding authorized Clients and e Suburban facility for the p ities. Suburban shall report litions from the Purchase C mpletion of this Purchase	hop/BT1, H24-33 Shop/BT4, n number using acid test as of results to PSC QA Departm Quality Assurance Plan, Rev. tory report indicating the resu ents of this Purchase Order. epartment shall authenticate a Contractors shall have right surposes of record review, ar t any defects or nonconformir order requirements to the PSC Order to determine include the Test Method used	autilined in ent. 9, dated 9/1/07 apply to th ults of the tests were in the laboratory results. PSC t-of-access nd/or audit or surveillance 19 C Quality Department prior	5	-044
	pædeny, i est reports will k	Iange (në test Menograseo	(madung year).		
		· · · · ·			
thörized Signati		<u>~</u>	Q.A BY:	PSC REVIEWED	

Rpt Ver: Pat 03/18/10 4:42:14 PM Rpt Ver ID: 03/18/10 4:47:12 PM Melissa 1 of 1

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TM-1043-500: Appendix C Revision 0. Page 1 of 24

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	Revi	sion 0, Page 1 of 24		
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Total .	Jack Calibr	ation Record	SAFETY RELATED NON-SAFETY RELATED	X
Precision Scoweillance Corporation			PAGE 1 OF	3.
CC	MPUTED BY: JRP	DATE: 07/14/09 REV	VIEWED BY: BAG DATE: 07	/14/09
Project: POST BY	RON/PRE TME		Contract No: N1044	
	PINE	Size: 1000 Tons	Register No: 9370	_
Theoretical Ram Are			Max Pressure: 8500 psi	
Calibrating Device U		egister No: 4734	Constant: 33005	
Calibrating Gauge U		egister No: S9-27100	Due Date: 06/19/11	
	RALD BUSSONE Date: 07			-
Mean Ram Area:	WHEN AND A PROPERTY AND A	kips Agency: N		
Computed By: JOH		QC Check:		
Title: FIELD ENGIN			Date:	
		<u> </u>		
Target Pressure (PS	I) Gauge Reading (PSI)	Load Cell Readout	Comments	
1000	1030	6.82	RUN: 1 POSITION: 1.5"	
2000	2008	13.30		
3000	3018	20.02		
4000	4008	26.64		
5000	5006	33.26		
6000	6006	39.90		
7000	7008	46.56		
8000	8020	53.28		Î
8500	8505	56.48		
			7	
1000	1014	6.62	RUN: 2 POSITION: 3"	
2000	2020	13.30		7
3000	3004	19.80	1 .	
4000	4016	26.54	7	
5000	5002	33.04	7	
6000	6016	39.74		
7000	7017	46.38	1	
8000	8015	52.96	-	
8500	8510	56.22		
			7	
1000	1040	6.78	RUN: 3 POSITION: 4.5"	
2000	2020	13.30		
3000	3014	19.78	1	
4000	4001	26.50	1	
5000	5009	33.18	1	
6000	6012	39.72	-	
7000	7023	46.54	1	
8000	8002	52.96	1	
8500	8507	56.26	1	
			1 .	

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TM-1043-500: Appendix C Revision 0, Page 2 of 24

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A A.	HYDRAULIC J	ACK CALIBRA	TION	REVISION #		0
X BX	Lincor Do	rection Analysia		SAFETY RELAT	ED	x
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Freeigion Suncellance						L
Corporation				PAGE	2 OF	3
	COMPUTED BY: JRP	DATE: 07/14/09	REVIEWED BY:	BAG	DATE: 07	7/14/09
Project: POST E			Contrac	t No: N1044		
	PINE	Size: 1000 Tons				<u> </u>
Jack Description:		Size: 1000 Tons	•			······
Theoretical Ram Are		Disalatasitas inc.	Max Pre	eterson and an and a second	psi	
Calibrating Device U		Register No: 4734	Constan			
Calibrating Gauge U	sed: HEISE	Register No: S9-27100) Due Dal	te: <u>06/19/1</u>	I	
	Actual Gauge Reading (psi)	Load Cell Readout	Computed I	Force (kips)		
	1030	6.82		.094		
}—	2008	13.30				
}	3018	20.02		.967 .760		
	4008	26.64	879.			
	5006	33.26		.746		
	6006	39.90	1316			
	7008	46.56	1536			
ļ	8020	53.28	1758	and the second		
	8505	56.48	1864			
	1014	6.62	218.			
↓	2020	13.30	438.			
·	3004	19.80	653.		•	
	4016	26.54 33.04	875.			
			1090			
	6016	39.74	1311			
	<u>7017</u> 8015	46.38	1530			
	8015	52.96	1/4/			
	1040	6.78	223.			
├	2020	13.30	438.			
<u>├</u>	3014	19.78	652.			
<u>}</u>	4001	26.50	874.			ĺ
	5009	33.18	1095			
├ ──	6012	39.72	1310			
·	7023	46.54	1536	and the second se		
	8002	52.96	1747			
	8507	56.26	1856			
]
	* Indicates these reading	s have been omitted from th	efinal computations	J		
Erro	rs In Jack Calibration					
	Error In Standard			0.0100 ksi	-	
	Interpolation in Gauge			0.0000 ksi		
	Accuracy of Gauge			0.0000 ksi		
Erro	rs In Gauge Calibration					
	Interpolation in Master	•••••••••••••••••••••••••••••••••••••••		0.0000 ksi		
	Interpolation in Field Gauge.	•••••••••••••••••••••••••••••••••••••••	•••••			
	Accuracy of Master	•••••••••••••••••••••••••••••••••••••••	•••••••	0.0100 ksi		
	Accuracy of Field Gauge		••••••	0.0275 ksi		
Erro	rs In Field Use of Gauge					
	Interpolation Error					
	Accuracy Error					
Max	imum Gauge Reading Used	• • • • • • • • • • • • • • • • • • • •		8.5100 ksi		
FORCE	$(kips) = 218.894 (in^2)$	X GAUGE R	EADING (ksi)	+ -2.2	48 (kips)	
Correlati	on = 0.99998387		N/NO = 1.0000) (Not < 0.6666	371	
	n Error Ratio in Jack			0084	···)	
	n Error Ratio In Gauge			0084		
	n Total Error Ratio			0049 0098		I
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TM-1043-500: Appendix C Revision 0, Page 3 of 24

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Corporation			03/14/00			PAGE		OF	3
	COMPUTED BY:	JRP DATE	E: 07/14/09	REVIEW	VED BY:	BAG	DATE:		/14/09
Project: POST	BYRON				Contra	act No: N1044			
Jack Description	: PINE	Siz	e: <u>1000</u> To	ns	Regist	ter No: 9370	· · · · · · · · · · · · · · · · · · ·		
Theoretical Ram	·····	. in.	·····		-	Pressure: 8500	0	psi	
	ce Used: TELEDYN		er No: 4734		Consta			'	
Calibrating Gaug		Regist		-27100	Due D		1		I
Calibrating Caug		INGGIOU	BEIND, CO-	-27 1.00	Due D	ale. Ouriari		A Stationary Stationers	
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TM-1043-500: Appendix C Revision 0. Page 4 of 24

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	Rev	ision 0, Page	4 of 24					
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Takt	Jack Calibra	ation Re	cord		SAFETY RELA		·	X
Precigion Surveillance					PAGE	1	OF	3
Corporation	PUTED BY: JRP	DATE: 0	9/23/09 REV	IEWED BY:	BAG	DATE		/23/09
								ويستغيذيبي
Project: MID TMI		Mr. 4. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		Contra	act No:: N104	3		
Jack Description: Pll	NE	Size: 10	00_Tons	Regist	ter No: 9370			
Theoretical Ram Area:	220 sq. in.			Max P	ressure: 8	500	psi	
Calibrating Device Use	d: TELEDYNE Re	gister No:	4734	Const	ant: 3300	5		
Calibrating Gauge Use	d: HEISE Re	gister No:	S9-27100	Due D	ate: 06/19	9/11		
Raw Data By: DAVE	PRITT Date: 09	/23/09	Witness: N/	/A				
	A DEAL OF THE R. LEWIS CO.		Agency: N/		D	ate: N/A		
Computed By: JOHN		<u></u> p.c	QC Check:				-	
Title: FIELD ENGINE		/23/00	Title:		D	ate:		
		20/09	p. me.					
Target Pressure (PSI)	Gauge Reading (PSI)	Lood C	ell Readout	Т	Comme	nte		1
		<u> </u>					A (=1)	_
1000	1025	†	6.78	RUN: 1	POSI	TION:	1.5	
2000	2038		3.48	4				
3000	3021	t	0.04	4				
4000	4013	1	6.68	4				
5000	5015 -	3	3.36					
6000	6021	4	0.08					
7000	7016	4	6.74					
8000	8034	5	3.56					
8500	8516	5	6.80					
]				
1000	1008	. (6.66	RUN: 2	POSI	TION: :	3."	
2000	2022	1	3.36	1 —		1		
3000	3025		0.08	1				
4000	4022		6.72	1				
5000	5020		3.40					
6000	6021		0.10	1				
7000	7014		6.76					
				1				
8000	8010		3.42					
8500	8530	5	6.90					
	i a a a							
1000	1014		5.68	RUN: <u>3</u>	POSI		1.5"	_
2000	2017		3.28					
3000	3018	1	9.98					
4000	4030		6.74					
5000	5021	3	3.48					
6000	6013	3	9.98					
7000	7008	4	6.66					
8000	8043	5	3.52					
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TM-1043-500: Appendix C Revision 0, Page 5 of 24

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A	Linear	Regression A	nalysis		SAFETY RELAT	TED	X
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r	COMPUTED BY: JRP	P DATE:	09/23/09	REVIEWED BY:	BAG	DATE:	09/23/09
Project: MID TM	Л			Contrac	t No: N1043		
Jack Description:	PINE	Size: _10	000 Tons		r No: 9370	······································	
Theoretical Ram Are	· · · · · · · · · · · · · · · · · · ·			Max Pre			psi
Calibrating Device U	· · · · · · · · · · · · · · · · · · ·	Register No:	4734	Constan			
Calibrating Gauge U	Jsed: HEISE	Register No:	<u>\$9-27100</u>	Due Dat	te: 06/19/1	[1	<u> </u>
	Actual Gauge Reading (psi)	Load Cel	I Readout	Computed I	Force (kips)]	
	1025		.78	223.	.774		
	2038		.48		.907]	
	3021		.04	661.			
	4013		.68		.573	4	
	<u>5015</u> 6021		.36		1.047 2.840	4	
	7016		5.74		2.654	-	
	8034		.56		7.748	1	
	8516		.80		1.684	1	
	1008		66	219.		1	
	2022		.36	440.]	
	3025		.08	662.		4	
	4022 5020		.72		.894	-	İ
	6021		.40	1102		4	I
	7014		.76	1543		1	
	8010		.42	1763		1	
	8530	56.	.90	1877	.985	1	
<u> </u>	1014	6.6			.473		
└── ├ ─	2017		.28	438.]	
	3018		.98	659.		4	
	<u> </u>	26.	.74	882.		4	
	6013	39.		1319		1	
	7008	46.		1540		1	
	8043	53.		1766	.428	1	
	8511	56.	.70	1871	.384]	
	Mandala						
			·			4	
L	* Indicates these re	adings have been om	vitted from th	efinal computations]	:
_		adingo noro even e	Inter in the second second	onina oompaaaaa			
Erro	ors In Jack Calibration		MARTING TO A CONTRACT OF A CON		0.0100 kai	-	
	Error In Standard Interpolation in Gauge.						
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Errc	ors In Gauge Calibration			***********************	0.00000		
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	Accuracy of Master						
Erro	Accuracy of Field Gaug	je	•••••		0.0275 ksi		ļ
EIIU	ors In Field Use of Gauge Interpolation Error				0.0050 ksi	-	
	Accuracy Error						
Max	kimum Gauge Reading Used						
	.						
FORCE	E (kips) = 220.472 (i	n²) XG/	AUGE R	EADING (ksi)) + -4.:	255 (kip	s)
Correlati	ion = 0.99999722			N/NO = 1.0000	0 (Not < 0.666	667)	
Maximur	m Error Ratio In Jack				0092	,	
Maximur	m Error Ratio In Gauge				0049		1

Maximum Total Error Ratio.....

0.0105

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TM-1043-500: Appendix C Revision 0, Page 6 of 24

HYDRAULIC JACK CALIBRATION Comparison With Previous Calibration Document Type: Revision # Eng Revision # OMPUTED BY: JRP DATE: 09/23/09 Reviewed BY: BAG DATE: 09/23/09 Project: MID TMI Contract No: N1043 Image: Contract No: N1043 Image: Contract No: N1043 Jack Description: PINE Size: 1000 Tons Register No: 9370 Theoretical Ram Area: 220 sq. in. Max Pressure: 8500 psi Calibrating Device Used: TELEDYNE Register No: 4734 Constant: 33005 Calibrating Gauge Used: HEISE Register No: S9-27100 Due Date: 06/19/11 Data From Current Calibration Data From Previous Calibration Area (A): 218.894 sq. in. Constant (C _i): -2.248 kips Max Pressure (P): 8500 psi State (C _i): -2.248 kips State (C _i): -2.248 kips
Comparison With Previous Calibration SAFETY RELATED X Reviewed Kinger SAFETY RELATED PAGE 3 OF 3 COMPUTED BY: JRP DATE: 09/23/09 REVIEWED BY: BAG DATE: 09/23/09 Project: MID TMI Contract No: N1043 05 3 Jack Description: PINE Size: 1000 Tons Register No: 9370 Theoretical Ram Area: 220 sq. in. Max Pressure: 8500 psi Calibrating Device Used: TELEDYNE Register No: 4734 Constant: 33005 Calibrating Gauge Used: HEISE Register No: S9-27100 Due Date: 06/19/11 Data From Current Calibration Data From Previous Calibration Area (A _t): 218.894 sq.in. Constant (C _t): -2.248 kips
Mon-SAFETY RELATED Non-SAFETY RELATED PAGE 3 OF 3 COMPUTED BY: JRP DATE: 09/23/09 REVIEWED BY: BAG DATE: 09/23/09 Project: MID TMI Contract No: N1043
PAGE 3 OF 3 COMPUTED BY: JRP DATE: 09/23/09 REVIEWED BY: BAG DATE: 09/23/09 Project: MID TMI Contract No: N1043
COMPUTED BY:JRPDATE:09/23/09REVIEWED BY:BAGDATE:09/23/09Project:MID TMIContract No:N1043Jack Description:PINESize:1000TonsRegister No:9370Theoretical Ram Area:220sq. in.Max Pressure:8500psiCalibrating Device Used:TELEDYNERegister No:4734Constant:33005Calibrating Gauge Used:HEISERegister No:S9-27100Due Date:06/19/11Data From Current Calibration Area (At):220.472 sq.in.Data From Previous Calibration Area (At):218.894 sq.in. Constant (Ct):-2.248 kips
Project: MID TMI Contract No: N1043 Jack Description: PINE Size: 1000_Tons Register No: 9370 Theoretical Ram Area: 220sq. in. Max Pressure: 8500psi Calibrating Device Used: TELEDYNE Register No: 4734 Constant: 33005 Calibrating Gauge Used: HEISE Register No: S9-27100 Due Date: 06/19/11 Data From Current Calibration Data From Previous Calibration Area (A _t): 218.894 sq.in. Constant (C _t): -4.255 kips Constant (C _t): -2.248 kips
Jack Description:PINESize:1000TonsRegister No:9370Theoretical Ram Area:220sq. in.Max Pressure:8500psiCalibrating Device Used:TELEDYNERegister No:4734Constant:33005Calibrating Gauge Used:HEISERegister No:S9-27100Due Date:06/19/11Data From Current CalibrationArea (Ar):220.472sq. in.Area (Ar):218.894sq. in.Constant (Cr):-4.255kipsConstant (Cr):-2.248kips
Theoretical Ram Area: 220 sq. in.Max Pressure: 8500 psiCalibrating Device Used:TELEDYNERegister No: 4734Constant: 33005Calibrating Gauge Used:HEISERegister No: 59-27100Due Date: 06/19/11Data From Current CalibrationData From Previous CalibrationArea (Ar):220.472 sq.in.Area (Ar): 218.894 sq.in.Constant (Cr):-4.255 kipsConstant (Cr): -2.248 kips
Calibrating Device Used: TELEDYNE Register No: 4734 Constant: 33005 Calibrating Gauge Used: HEISE Register No: S9-27100 Due Date: 06/19/11 Data From Current Calibration Data From Previous Calibration Area (A _t): 220.472 sq.in. Area (A _t): 218.894 sq.in. Constant (C _t): -4.255 kips Constant (C _t): -2.248 kips
Calibrating Gauge Used: HEISE Register No: S9-27100 Due Date: 06/19/11 Data From Current Calibration Data From Previous Calibration Area (A _t): 220.472 sq.in. Data From Previous Calibration Constant (C _t): -4.255 kips Constant (C _t): -2.248 kips
Data From Current CalibrationData From Previous CalibrationArea (A_i) :220.472 sq.in.Area (A_i) :218.894 sq.in.Constant (C_i) :-4.255 kipsConstant (C_i) :-2.248 kips
Area (A_f) :220.472 sq.in.Area (A_i) :218.894 sq.in.Constant (C_f) :-4.255 kipsConstant (C_i) :-2.248 kips
Area (A_f) :220.472 sq.in.Area (A_i) :218.894 sq.in.Constant (C_f) :-4.255 kipsConstant (C_i) :-2.248 kips
Constant (C ₁): -4.255 kips Constant (C ₁): -2.248 kips
Max Pressure (P): 8500 psi
$\frac{i-f}{i} x 100\% = -0.614\%$
$\frac{y}{100\%} = -0.614\%$
1
l .
WHERE:
$i = (A \times D) + (C + 1000)$
$i = (A_i \times P) + (C_i * 1000)$
$f = (A_f \times P) + (C_f * 1000)$

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TM-1043-500: Appendix C

		Revision 0, Pa		;				
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(VoV)				TION		SION #		0
1 XX	Jack C	alibration R	Record			TY RELATED		x
Recipion Surveillance						SAFETY RELATE	<u>sD</u> OF	3
Corporation	COMPUTED BY: JRP	DATE:	12/22/09	REVIEWED				
								ana ang ang ang ang ang ang ang ang ang
Project: POST T						o: N1043		
Jack Description:	PINE	Size:	<u>1000</u> To	ns R	egister No	o: <u>9370</u>		_
Theoretical Ram A	Area: <u>220</u> sq. in.			M	ax Press	ure: <u>8500</u>	ps	și 🛛
Calibrating Device	Used: DAYTRONIC	Register N	o: <u>17010</u>	C	onstant:	44694.6		_
Calibrating Gauge	Used: HEISE	Register N	o: S9-27	100 D	ue Date:	06/19/11		
Raw Data By: D	DAVE PRITT Da	te: 12/22/09	Witnes	ss: <u>N/A</u>				_
Mean Ram Area:	219:313 sq. in. K=	-1.189 kips	Agenc	y: <u>N/A</u>		Date: N	I/A	
Computed By: J	OHN PARV		QC CH	neck:				
Title: FIELD ENG	INEER Da	te: 12/22/09	Title:			Date:		
Target Pressure (PSI) Load	Cell Rea			Comments		
1000	1015		4.99	RUN	1	POSITION:	1.5"	
2000	2024		9.91					
3000	3012		14.78					
4000	4015		19.67					
5000	5014		24.58					
6000	6014	· · · · · · · · · · · · · · · · · · ·	29.46					
7000	7012		34.32					
8000	8012		39.21					
8500	8521		41.68					
1000	1017		4.95	RUN	2	POSITION:	3"	
2000	2032		9.90				<u> </u>	
3000	3027		14.83					
4000	4019		19.73					
5000			24.61					
	5010							
6000	6032		29.61					Î
7000	7036		34.56					
8000	8013		39.31					Î
8500	8518		41.80					
1000	1005		4.87	RUN:	3	POSITION:	1 5"	
2000	2011		9.80		<u> </u>		4.0	
3000								
4000	3010		14.75					
	4012		19.67					
5000	5014		24.58					
6000	6022		29.53					
7000	7013		34.39					
8000	8014		39.28					
8500	8505		41.79					

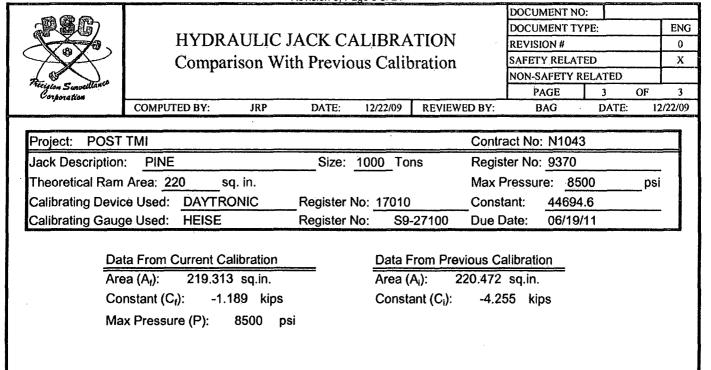
TM-1043-500: Appendix C Revision 0, Page 8 of 24

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			DOCUMENT T	YPE:	ENG
	HYDRAULIC .		Ó		
	Linear Re	gression Analysis	SAFETY RELA	TED	X
		Bi c i i i i i i i i i i	NON-SAFETY	RELATED	
Frecision Surveillance Corporation			PAGE	2 OF	3
~ orporation	COMPUTED BY: JRP	DATE: 12/22/09 R	EVIEWED BY: BAG	DATE: 12	2/22/09
0			Contract No: N1043		
Project: POST T Jack Description:	PINE	Size: 1000 Tons	Contract No: N1043 Register No: 9370)	
Theoretical Ram Are			Max Pressure: 8500	psi	
Calibrating Device U		Register No: 17010	Constant: 44694	and the second se	
Calibrating Gauge U		Register No: S9-27100	Due Date: 06/19/	and the second	
Calibrating Gauge C			······································		
	Actual Gauge Reading (psi)	Load Cell Readout	Computed Force (kips)	=	
	1015	4.99	223.026	_	
	2024	9.91	442.923	-1	:
	<u> </u>	14.78 19.67	660.586 879.143	-1	
·	5014	24.58	1098.593	-	
	6014	29.46	1316.703	1	
├──	7012	34.32	1533.919	1	
	8012	39.21	1752.475		
	8521	41.68	1862.871		
	1017	4.95	221.238		
	2032	9.90	442.477	4	
	3027	14.83	662.821	4	
	4019 5010	19.73 24.61	881.824 1099.934	-{	
	6032	29.61	1323.407	-	
·	7036	34.56	1544.645	-	
	8013	39.31	1756.945	-	
	8518	41.80	1868.234]	
	1005	4.87	217.663		
	2011	9.80	438.007	4	
	3010	14.75	659.245	4	
	4012 5014	19.67 24.58	879.143 1098.593	-	
⊢	6022	29.53	1319.832	-	
	7013	34.39	1537.047	-{	
	8014	39.28	1755.604		
	8505	41.79	1867.787	1	
]	
				4	
L	• In-11- Anno 11	n have been settled from the A		1	
	- indicates these reading	is have been omitted from thefi	nai computations		
Erro	rs In Jack Calibration			_	
		•••••••••••••••••••••••••••••••••••••••			
		· · · · · · · · · · · · · · · · · · ·			
Erro	rs In Gauge Calibration	·····	0.0000 ksi		
				-	
Erro	rs In Field Use of Gauge			_	
Max	imum Gauge Reading Used		8.5210 ks	I .	
FORCE	$(kips) = 219.313 (in^2)$	X GAUGE RE	ADING (ksi) + -1.	189 (kips)	
				(
Correlati	on = 0.99999428		N/NO = 1.0000 (Not < 0.66	667)	

Correlation = 0.99999428	N/NO =	1.0000 (N
Maximum Error Ratio In Jack		0.0073
Maximum Error Ratio In Gauge		0.0049
Maximum Total Error Ratio		0.0088
	· ·	

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TM-1043-500: Appendix C Revision 0, Page 9 of 24



$$\frac{i-f}{i} x 100\% = 0.363\%$$

WHERE:

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

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

TM-1043-500: Appendix C Revision 0. Page 10 of 24 ł

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		Revision 0, Pag	ge 10 of 24			_
PSC XoX		IC JACK CA Calibration R		DN R	DOCUMENT NO: DOCUMENT TYPE: REVISION # GAFETY RELATED	EN 0 X
	JUVA	Callulation	CCUTU		ON-SAFETY RELATED	
Precipion Serveillanet				<u> </u>	PAGE 1	OF 3
	COMPUTED BY: JRF	P DATE:	07/09/09 REV	VIEWED BY:	PCS DATE:	: 07/09/0
DOOT B	YRON /PRE-7	F#A Y		Contrac	• • • • • • • • • • • • • • • • • • •	
Project: POST B					21 No: N1044	
Jack Description:		Size:	1000 Tons	-	r No: <u>9371</u>	<u> </u>
	rea: <u>220</u> sq. in.	miinton N	· ····	· ·	essure: <u>8500</u>	psi
-	Used: TELEDYNE	Register N			nt: <u>33005</u>	/
	Used: HEISE		No: S9-27100	Due Dat	te: 06/19/11	
	ERALD BUSSONE	13 3 5 6 1 1 5 1 F 1 9 1 9 1		فسيستغلب كرنية عية النبيانيات الكافر التكافر الأمري		/
Mean Ram Area:	an and a state of the state of	-3.524 kips			Date: N/A	
Computed By: JO			QC Check:	<u></u>		
Title: FIELD ENG	INEER L	Date: 07/09/09	Title:	<u></u>	Date:	
Target Pressure (I		(PSI) Load	I Cell Readout		Comments	
1000	1025		6.74	RUN: 1	POSITION: 1	1.5"
2000	2030		13.24	_		
3000	3010		20.00			
4000	4009		26.62			
5000	5002		33.30]		
6000	6005		39.96	1		
7000	7010		46.72	1		
8000	8004		53.28	1		
8500	8505		56.66	1		l
				1		
1000	1032		6.72	RUN: 2	POSITION: 3	<u>ئ</u> "
2000	2003		13.26	1 -		
3000	3012		19.98	1		
4000	4006		26.62	1		
5000	5008		33.30	1.		
6000	6007		39.96	1		
7000	7004		46.62	1		
8000	8004		53.26	1		
8500	8507		56.56	1		
				-		
1000	1012	<u> </u>	6.66	RUN: 3	POSITION: 4.	5"
2000	2005		13.28	-		
3000	3007		19.96	1		
4000	4004		26.58	-		
	• • • • •	L		-		ļ
· · · · · · · · · · · · · · · · · · ·	5008		33.28	•		,
5000	5008		33.28 39.92	-		
5000 6000	5008 6008		39.92			
5000 6000 7000	5008 6008 7004		39.92 46.56	-		
5000 6000	5008 6008		39.92	-		

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TM-1043-500: Appendix C Revision 0, Page 11 of 24

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	HYDRAULIC JACK CALIBRATION Linear Regression Analysis					0
$\langle X \circ X \rangle$)	x
		gression Analysis	NON	-SAFETY REL	ATED	
Recision Suncellants				PAGE	2 OF	3
Corporation	COMPUTED BY: JRP	DATE: 07/09/09 RI	EVIEWED BY:	PCS	DATE: 07	7/09/09
Project: POST E			Contract No:	N1044	and and the state of the second s	
Project: POST E Jack Description:	PINE	Size: 1000 Tons	Register No:	9371		
Theoretical Ram Are			Max Pressure		psi	
Calibrating Device U		Register No: 4734	Constant:	33005	······································	
Calibrating Gauge U	sed: HEISE	Register No: S9-27100	Due Date:	06/19/11		
	Actual Gauge Reading (psi)	Load Cell Readout	Computed Force	(kins)		
	1025	6.74	222.454	((()))		
	2030	13.24	436.986			
	3010	20.00	660.100			
	4009	26.62	878.593			
	5002	33.30	1099.067			
	6005	39.96	1318.880			
	7010	46.72	1541.994			
	<u> </u>	53.28 56.66	1758.506 1870.063			
	1032	6.72	221.794			
	2003	13.26	437.646			
	3012	19.98	659.440			
	4006	26.62	878.593			
	5008	33.30	1099.067			
	6007	39.96	1318.880			
	7004	46.62 53.26	<u>1538.693</u> 1757.846			
	8507	56.56	1866.763			
	1012	6.66	219.813			
	2005	13.28	438.306			
	3007	19.96	658.780			
	4004	26.58	877.273			
ļ	5008	33.28	1098.406			
	<u> </u>	39.92 46.56	<u>1317.560</u> 1536.713			
	8004	53.16	1754.546			
	8506	56.42	1862.142			
	A 1 11 - 1 - 1 - 1 - 1 - 1 - 1					
	Indicates these reading	s have been omitted from thefin	nal computations			
Erro	ors In Jack Calibratión					
)100 ksi		
)000 ksi		
			0.0)000 ksi		
End	ors In Gauge Calibration		0.0)000 ksi		
)050 ksi		
)100 ksi		
	•			275 ksi		
Erro	rs In Field Use of Gauge					
	Interpolation Error		0.0	050 ksi		
	· · · · · · ·			275 ksi		
Max	imum Gauge Reading Used		8.5	i070 ksi		
FORCE	$(kips) = 220.008 (in^2)$	X GAUGE RE	ADING (ksi) +	-3.52	4 (kips)	

Correlation =	0.99999290	N/NO =	1.0000	(Not < 0.66667)
Maximum Error	Ratio In Jack		0.01	38
Maximum Error	Ratio In Gauge		0.004	49
Maximum Total	Error Ratio	•••••	0.01	46

TM-1043-500: Appendix C Revision 0, Page 12 of 24



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HYDRAULIC JACK CALIBRATIONDOCUMENTREVISION #REVISION #Comparison With Previous CalibrationSAFETY REINON-SAFETNON-SAFET

DATE:

COMPUTED BY: JRP

07/09/09 REVIEWED BY:

 DOCUMENT NO:
 ENG

 DOCUMENT TYPE:
 ENG

 REVISION #
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 SAFETY RELATED
 X

 NON-SAFETY RELATED
 X

 PAGE
 3
 OF

 PCS
 DATE:
 07/09/09

Project: POST BYRON				Contract No:	N1044
Jack Description: PINE		Size: 1000) Tons	Register No:	9371
Theoretical Ram Area: 22	0 sq. in.			Max Pressure	: 8500 psi
Calibrating Device Used:	TELEDYNE	Register No: 4	734	Constant:	33005
Calibrating Gauge Used:	HEISE	Register No:	S9-27100	Due Date:	06/19/11

Data From Current CalibrationArea (A_f):220.008 sq.in.Constant (C_f):-3.524 kipsMax Pressure (P):8500 psi

Data From Previous Calibration

Area (A _i):	219.798	sq	.in.
Constant (C _i):	-6.28	39	kips

 $\frac{i-f}{i} x 100\% = -0.244\%$

WHERE:

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

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

TM-1043-500: Appendix C Revision 0. Page 13 of 24

		Rev	lision 0, Page	9 13 01 24					
						DOCUMENT NO:			
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(XoX)					LŅ	REVISION #		•	0
TX		Jack Calibr	ation Re	ecord		SAFETY RELATED NON-SAFETY RELATED			X
Freeigion Surveillance				:		PAGE		OF	3
Corporation	COMP	UTED BY: JRP	DATE: (9/23/09 REVI	EWED BY:	BAG	DĂTE		9/23/09
							a da anna an		
Project: MID Th	MI				Contra	act No: N1043			
Jack Description:	PIN	NE	Size: 10	00 Tons	Regist	ter No: 9371			
Theoretical Ram	Area:	220 sq. in.			Max P	Pressure: 850	0	ps	í
Calibrating Devic	e Used	: TELEDYNE R	egister No	: 4734	Const	ant: 33005			
Calibrating Gaug			-	S9-27100	Due D		1		•
Raw Data By:				Witness: N/					
	and the second se	e-mi-first in the second se	6 kips	Agency: N/		Date	e: N/A		-
Computed By:			A what	QC Check:			. <u> </u>	-	
Title: FIELD EN			102/00			Date			-
TING. FIELDEN	GINEE		9/23/09	Title:	and a subscription of the subscription of the	Date	5.		
Townet Descention		Course Disading (DCI)	Land		T	<u> </u>			
Target Pressure	(PSI)	Gauge Reading (PSI)		Cell Readout		Comment			
1000		1005	<u> </u>	6.52	RUN: 1	POSITI	ON: _	1.5"	
2000		2012		13.20	4.				
3000		3007		19.82					
4000		4025		26.62	-				
5000		5020		33.24					
6000		6013		39.88					
7000		7015		46.60					
8000		8012		53.26					
8500		8534		56.76	1				
1000		1015		6.70	RUN: 2	POSITI	ON: 3	3"	
2000		2030	· { · · · · · · · · · · · · · · · · · ·	13.42			-		
3000		3011		19.98	1				
4000		4009		26.66					
5000		5033	1	33.54					
6000		6010	1	40.04					
7000		7006		46.72					
8000		8010		53.44					
8500		8511		56.78					
1000		1010	1	6.64	RUN: <u>3</u>	POSITI	ON: 4	1.5"	
2000		2041	· · · · ·	13.50					
3000		3014		20.02					
4000		4010		26.68			•		
5000		5024		33.48					
6000		6023	4	10.16					
7000		7038	1	6.96					
8000		8012	·•••	53.46					
8500		8511		56.80					
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TM-1043-500: Appendix C Revision 0, Page 14 of 24

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JKOU)	T137		TACTZ		TION		IENT TYPE	i:	ENG	
	HY.	HYDRAULIC JACK CALIBRATION					REVISION #			
A		Linear Regression Analysis					SAFETY RELATED			
							AFETY REL	ATED		
Recigion Surveillanth							GE		OF 3	
Corporation	COMPUTED BY	Y: JRP	DATE:	09/23/09	REVIEWED BY:		ÀG	DATE:	09/23/09	
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Project: MID TM					Contra	ct No:	N1043			
Jack Description:	PINE		Size:	1000 Tons	•		9371			
Theoretical Ram Ar		sq. in.					8500		_psi	
Calibrating Device L		EDYNE	Register No:	4734	Consta		33005			
Calibrating Gauge L	Jsed: HEIS	SE	Register No:	S9-2710) Due Da	ate:	06/19/11			
r	Actual Gauge	Reading (nsi)		ell Readout	Computed	Force (ki	(ne)			
	100			3.52		5.193	<u>he)</u>			
	202			3.20		5.666				
	300			9.82		4.159				
	402		in the second	6.62	in the second	8.593				
	502	and the second sec		3.24		7.086				
	601		and the second secon	9.88		6.239				
	701	A COMPANY OF THE OWNER	4	6.60		8.033				
	801	12	5	3.26		7.846				
	853			6.76	187	3.364				
	101			6.70		1.134				
	203	30	1	3.42		2.927				
	301			9.98		9.440				
	400			6.66		9.913				
	503			3.54		6.988				
	601			0.04		1.520				
	700			6.72	a a second a	1.994				
	<u>801</u> 851			3.44 6.78		3.787 4.024				
	101			0.78 0.64		4.024).153				
	204	a de la companya de l		3.50		5.568				
	301			0.02).760				
	401			6.68).573				
	502			3.48	and the second	5.007				
	602	23		0.16		5.481				
	703	38	4	6.96		9.915				
	801	2	5	3.46	176	4.447				
	.851	1	5	6.80	187	4.684				
	* India	cates these readin	gs have been o	mitted from th	nefinal computation	S				
Frr	ors in Jack Calibra	tion								
		·				. 0.0100	0 ksi			
	Accuracy	of Gauge				. 0.0000	0 ksi			
Erre	ors In Gauge Calib	ration								
•••••••	Interpolat	lion in Master				. 0.0000	0 ksi			
	Interpolat	ion in Field Gauge	Э			. 0.0050	0 ksi			
					•••••		0 ksi			
			•••••		•••••••••••••••••••••	0.0275	5 ksi			
Erro	ors In Field Use of									
- ·					•••••					
Max	kimum Gauge Rea	ding Used	• • • • • • • • • • • • • • • • • • • •			8.5340) ksi			
	(king) = 22	0 500 /1-2	Y.C			а т (6 /L.	nel	
FURUE	: (kips) = 22	.v.599 (in ⁻)		NUGE N		7	-5.48	6 (kij	hal	
Correlat	ion = 0.999988	00			N/NO = 1.000	0 (Not	< 0.66667)	1		
	m Error Ratio In Ja					.0124				
,-	· · · · · · · · · · · · · · · · · · ·									

Correlation = 0.99998800	N/NO =	1.0000 (N
Maximum Error Ratio In Jack		0.0124
Maximum Error Ratio In Gauge		0.0049
Maximum Total Error Ratio		

TM-1043-500: Appendix C Revision 0, Page 15 of 24

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		noion o, r ago to or E r		
		· · ·	DOCUMENT NO: DOCUMENT TYPE:	ENC
	HYDRAULIC JA	REVISION #	ENG 0	
	Comparison With	Previous Calibration	SAFETY RELATED	x
Recigion Supposillance	r		NON-SAFETY RELATED	
Corporation	COMPUTED BY: JRP	DATE: 09/23/09 REVIEW	PAGE 3 OF ED BY: BAG DATE: 09	3.
Project: MID T			Contract No: N1043	
Jack Description		Size: 1000 Tons	Register No: <u>9371</u>	
Theoretical Ram			Max Pressure: 8500 psi	
-		egister No: 4734	Constant: <u>33005</u>	
Calibrating Gaug	e Used: HEISE R	egister No: S9-27100	Due Date: 06/19/11	
Da	a From Current Calibration	Data From Prev	ious Calibration	
	a (A _f): 220.599 sq.in.		20.008 sq.in.	
	nstant (C _f): -5.486 kips	Constant (C _i):	•	
	x Pressure (P): 8500 psi		•	
	: ſ			
	$l-J$ $r_{1000/}$	/ 0.4640/		
	$\frac{i-f}{i} x 100\%$	$_0 = -0.164\%$		
	l			
	WHERE:			
	$i = (A_i \times P) + i$	(C _i * 1000)		
	$f = (A_f \times P) + (A_f \times P)$	(C _f * 1000)		
	· · ·	-		
	<i>,</i>			
				1

TM-1043-500: Appendix C Revision 0, Page 16 of 24

DOCUMENT NO:

REVISION #

REVIEWED BY:

DOCUMENT TYPE:

SAFETY RELATED

BAG

Contract No: N1043

Max Pressure: 8500

Register No: 9371

Constant:

Due Date:

RUN: 1

NON-SAFETY RELATED PAGE

44694.6

06/19/11

Date: N/A

POSITION: 1.5"

Date:

Comments

ENG

0

X

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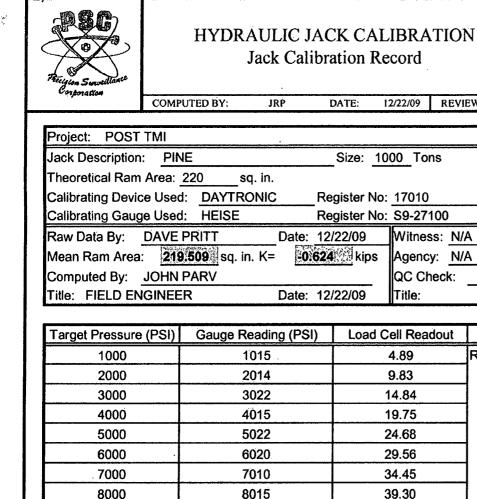
12/22/09

OF

psi

1

DATE:



		19.75	4015	4000
		24.68	5022	5000
		29.56	6020	6000
		34.45	7010	. 7000
		39.30	8015	8000
		41.76	8512	8500
POSITION: 3"	RUN: 2	4.95	1019	1000
		9.91	2026	2000
		14.85	3020	3000
		19.70	4012	4000
		24.59	5010	5000
		29.51	6011	6000
		34.49	7033	7000
		39.29	8016	8000
]	41.75	8512	8500
POSITION: 4.5"	RUN: 3	4.92	1010	1000
		9.85	2014	2000
		14.82	3017	3000
		19.74	4011	4000
		24.64	5013	5000
		29.58	6016	6000
		34.48	7017	7000
		39.36	8022	8000
	7	41.94	8530	8500

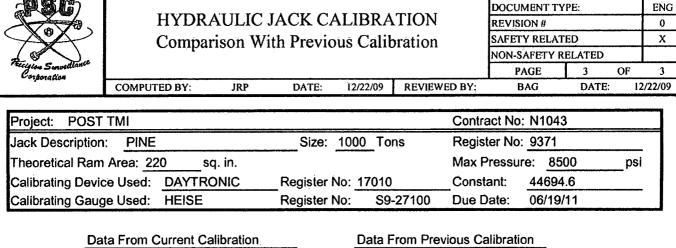
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				1	DOCUMENT NO	<u>ж. </u>	
"二周周历7				·	DOCUMENT TY	PE:	ENG
N. No.	HYDRAUJ	LIC JACK CA	ALIBRAT	ION	REVISION #	<u> </u>	0
X X	Linea	ar Regression A	Analysis	1	SAFETY RELATI	ED	x
	ېنې نې A A A استار	I INCELOUIOI .	rinarysis	,	NON-SAFETY RE		<u> </u>
Precision Surveillance Corporation				,	PAGE	2 01	F 3
Corporation	COMPUTED BY: JF	RP DATE:	12/22/09 F	REVIEWED BY:	BAG	DATE:	12/22/09
- · ·							
Project: POST] Jack Description:	PINE	Size:	1000 Tons	Contrac Register			
Jack Description: Theoretical Ram Are		JILD. ,	1000 1005	Register Max Pre	*****		psi
Calibrating Device U		Register No:	: 17010	Constan			וצל,
Calibrating Device C		Register No:				a second as a second design of the second	
						1	
	Actual Gauge Reading (ps		Cell Readout		Force (kips)	l	
	1015		4.89		3.557 *	1	
<u></u>	2014 3022		9.83 14.84	and the second se	9.348 9.268	1	
├──	4015		14.84 19.75		2.718	1	
	5022		24.68		3.063	1	
	6020		29.56		1.172	ł	
	7010		34.45	1539	9.729	l	
	8015		39.30		6.498	1	
	8512		41.76		6.446	I	
<u>⊢</u>	1019		4.95		.238	I	
<u>⊢</u> ⊣	2026		9.91		2.923	1	
┣	<u>3020</u> 4012		14.85 19.70	the second s).715).484	I	
├ ──	5010		19.70 24.59		9.040	i	
	6011	and the second	29.51		9.040 8.938	I	1
├	7033		34.49		1.517	I	ł
E	8016		39.29	1756		I	1
	8512	4	41.75		6.000	I	i
Ē.	1010		4.92		0.897	I	
	2014	and the state of the	9.85		.242	I	
<u>⊢</u> −	3017		14.82	662.		I	
	<u>4011</u> 5013		19.74 24.64	882.	and the second	i	
<u>⊢</u> −	6016		24.64 29.58	1101	1.275	I	
	7017		29.56 34.48	and the second	1.070	I	
F	8022		39.36	1759		I	
	8530		41.94	1874		I	
						I	
	· · · · · · · · · · · · · · · · · · ·					I	
L		<u> </u>				i	l
	* Indicates these	readings have been o	unitted from the	afinal computations	ذ		l
Errc	ors In Jack Calibration						-
_		,					I
		je:.,					
E		••••••			0.0000 ksi		
Enc	ors In Gauge Calibration	*					
	•	er Gauge					ļ
	•	Gauge					
	-	auge					
Errc	ors In Field Use of Gauge	ugo			U.UET		1
		••••••••••••			0.0050 ksi		ļ
		••••••			0.0275 ksi		
Max	ximum Gauge Reading Used		••••••	••••••	8.5300 ksi		!
							l
FORCE		·· 2. X(· · _0 <i>F</i>	···· (kin	-1
	E (kips) = 219.509	(in⁻) ∧ v	JAUGE NL	EADING (ksi)) + -0.6	624 (kip	s)
Correlati	tion = 0.99999535			N/NO = 0.9630	0 (Not < 0.6666	67)	ļ
·	m Error Ratio In Jack				.0081		

Conception = 0.99999535	N/NO =	0.9630	(NO
Maximum Error Ratio In Jack		0.00)81
Maximum Error Ratio In Gauge	· · · · · · · · · · · · · · · · · · ·	0.00)49
Maximum Total Error Ratio		0.00)95

TM-1043-500: Appendix C Revision 0, Page 18 of 24



Area (A₁): 219.509 sq.in. Constant (C₁): -0.624 kips Max Pressure (P): 8500 psi Area (A_i): 220.599 sq.in.

DOCUMENT NO:

Constant (C): -5.486 kips

$$\frac{i-f}{i} \times 100\% = 0.236\%$$

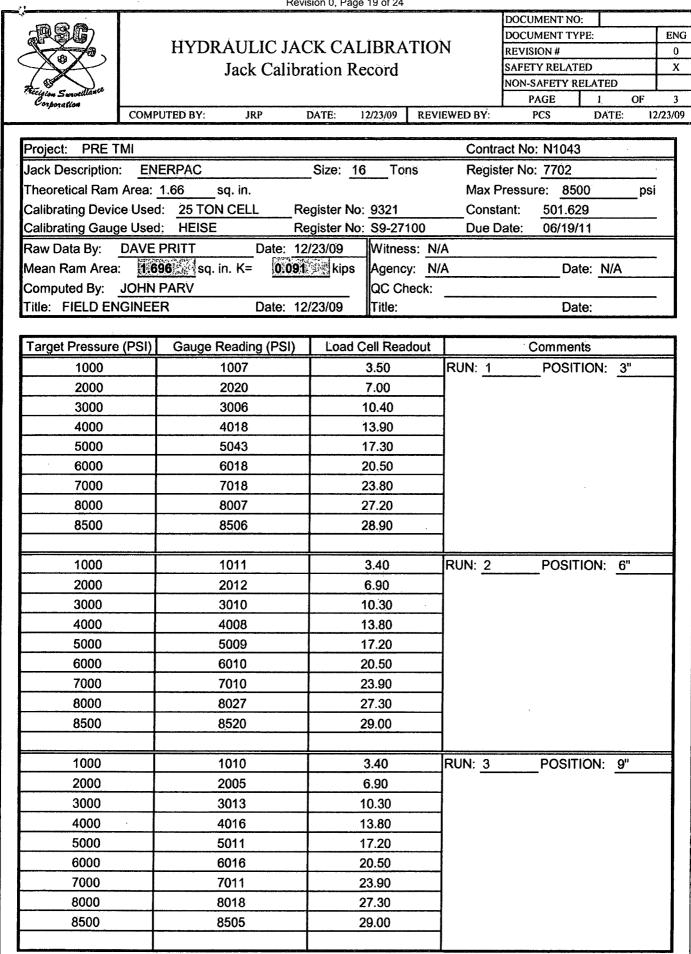
WHERE:

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

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

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TM-1043-500: Appendix C Revision 0, Page 19 of 24



TM-1043-500: Appendix 0	2
Revision 0, Page 20 of 24	

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				DOCUMENT NO:	:	
				DOCUMENT TYP	PE:	ENG
	HYDRAULIC	JACK CALIBRA	TION	REVISION #		0
	Linear De	gression Analysi	a	SAFETY RELATE		x
		gression Analysi	5	NON-SAFETY RE		1
Recigion Surveillance	1			PAGE	2 OF	3
Corporation		DATE JADANO				
	COMPUTED BY: JRP	DATE: 12/23/09	REVIEWED BY:	PCS	DATE: 1	2/23/09
Project: PRE TM	41		Contrac	t No: N1043		
Jack Description:	ENERPAC	Size: 16 Tor	ns Registe	r No: 7702		
Theoretical Ram Are			Max Pre	essure: 8500	psi	
Calibrating Device U	Ised: 25 TON CELL	Register No: 9321	Consta	nt: 501.629		
Calibrating Gauge U	Ised: HEISE	Register No: 59-271	00 Due Da	te: 06/19/11		
	Actual Course Deading (pai)	Load Cell Readout	Companyad	Fares (Idea)		
	Actual Gauge Reading (psi)			Force (kips)		
	1007 2020	3.50 7.00		756 * 511		
	3006	10.40		217		
	4018	13.90		973		
	5043	17.30		678		
	6018	20.50		283		
	7018	23.80		939		
	8007	27.20	and the second	644		
	8506	28.90		497		
	1011	3.40	and the second se	706 *		
	2012	6.90	3.4	461		
	3010	10.30	5.1	167		
	4008	13.80		922		
	5009.	17.20		328		
	6010	20.50		283		
	7010	23.90	and the second secon	989		
	8027	27.30		694		
	8520	29.00		547		
	<u> </u>	3.40		706 * 161	¢	
	3013	10.30		167		
	4016	13.80		22		
	5011	17:20		528		
	6016	20.50		283		
	7011	23.90		989		
	8018	27.30	13.	694		
	8505	29.00	14.	547		
				·		
	······································	L				
	* Indicates these reading	gs have been omitted from	thefinal computations	5		
Erro	ors In Jack Calibration					
	Error In Standard			0.0100 ksi		
	Interpolation in Gauge					
	Accuracy of Gauge			0.0000 ksi		
Erro	ors In Gauge Calibration		•			
	Interpolation in Master					
	Interpolation in Field Gauge					
	Accuracy of Master					
-	Accuracy of Field Gauge		••••••••••••••••••••••••••••	0.0275 ksi		
Erro	ors In Field Use of Gauge					
	Interpolation Error					
Max	Accuracy Error					
wax	kimum Gauge Reading Used		• • • • • • • • • • • • • • • • • • • •	8.5200 ksi		
FORCE	(kips) = 1.696 (in ²)	X GAUGE	READING (ksi) + 0.09)1 (kips)	
				,		
Correlat				9 (Not < 0.6666	7)	
Maximul	m Error Ratio in Jack			.0123		
	m Error Ratio In Gauge			0049		
Maximui	m Total Error Ratio			0132		ļ

TM-1043-500: Appendix C Revision 0, Page 21 of 24

~~~							DOCUMEN	I'NO:		
JREG (F)			-				DOCUMEN	Г ТҮРЕ:		ENG
	HYDR	AULIC	JACK CA	LIBRA	TION		<b>REVISION</b> #			0
A C	Compa	rison W	ith Previo	us Calib	ration		SAFETY RE	LATED		X
							NON-SAFET	Y RELATED		
Precision Surveilland							PAGE	3	OF	3
<i></i>	COMPUTED BY:	JRP	DATE:	12/23/09	REVIEWE	D BY:	PCS	DATE	1	2/23/09
1. 1947 - 19 19 19 19 19 19 19 19 19 19 19 19 19				· · · · · · · · · · · · · · · · · · ·		1 17 AUGUSTA	a contraction and a contraction of the second se			
Project: PRE T	MI					Contra	act No: N1	043	and a second second	
Jack Description	: ENERPAC		Size:	16 Ton	IS	Regis	ter No: 770	02		
Theoretical Ram	Area: 1.66	sq. in.				Max F	Pressure:	8500	ps	j
Calibrating Device	e Used: 25 TON	I CELL	Register N	lo: <u>9321</u>		Const	ant: <u>50</u>	1.629		
Calibrating Gaug	e Used: HEISE	·	Register N	lo: S9-	27100	Due D	ate: 06/	/19/11		
Da	ta From Current C	alibration		Data F	rom Previ	ous Ca	alibration			

Area (A_f): 1.696 sq.in. Constant (C_f): 0.091 kips Max Pressure (P): 8500 psi

1

Area (A_i): 1.698 sq.in. Constant (C_i): 0.098 kips

DOCUMENT NO:

$$\frac{i-f}{i} x 100\% = 0.162\%$$

WHERE:

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

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

TM-1043-500: Appendix C Revision 0, Page 22 of 24



# HYDRAULIC JACK CALIBRATION

Jack Calibration Record

DATE:

DOCUMENT NO: ENG DOCUMENT TYPE: **REVISION #** 0 Х SAFETY RELATED NON-SAFETY RELATED PAGE 1 OF 3 PCS 12/29/09

CON	<b>1PUTED</b>	BY:	DJM

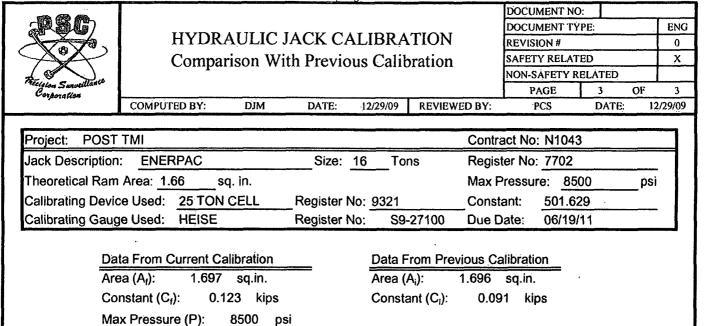
12/29/09 **REVIEWED BY:**  DATE:

Project: POST TMI			Contract No: N	1043	
Jack Description: ENERPAC	Size: 16	Tons	Register No: 77	702	
Theoretical Ram Area: <u>1.66</u> sq. in	<b>.</b>		Max Pressure:	8500	psi
Calibrating Device Used: 25 TON CE	LLRegister No:	9321	Constant: 50	01.629	
Calibrating Gauge Used: HEISE	Register No:	S9-27100	Due Date: 06	<u>5/19/11</u>	
Raw Data By: DANIEL O'SHEA		Witness: N/A			
Mean Ram Area: 1.697 kg sq. in. K	= 0.123 kips	Agency: N/A		Date: N	J/A
Computed By: DAVID MALDONADO		QC Check:			
Title: FIELD ENGINEER	Date: 12/29/09	Title:		Date:	

1000         1006         3.55         RUN: 1         POSITION: 3"           2000         2002         6.95         3000         3004         10.40           4000         4002         13.85         5000         5000         17.25           6000         6003         20.55         7000         7001         23.85           8000         8002         27.20         8500         28.95           1000         1023         3.40         RUN: 2         POSITION: 6"           2000         2000         6.85         3000         3001         10.35           4000         4000         13.85         6000         6000         7000         7001         24.05           8000         8000         27.30         8500         8501         29.05         9"           1000         1027         3.55         RUN: 3         POSITION: 9"         9"           2000         2004         6.90         3000         3002         10.35         4000         4010         13.80           5000         3002         10.35         4000         4010         13.80         9"           2000         2004         6.90         90         <	Target Pressure (PSI)	Gauge Reading (PSI)	Load Cell Readout	Comments
3000         3004         10.40           4000         4002         13.85           5000         5000         17.25           6000         6003         20.55           7000         7001         23.85           8000         8002         27.20           8500         8500         28.95	1000	1006	3.55	RUN: 1 POSITION: 3"
4000         4002         13.85           5000         5000         17.25           6000         6003         20.55           7000         7001         23.85           8000         8002         27.20           8500         8500         28.95           1000         1023         3.40           2000         2000         6.85           3000         3001         10.35           4000         4000         13.85           5000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80 </td <td>2000</td> <td>2002</td> <td>6.95</td> <td></td>	2000	2002	6.95	
5000         5000         17.25           6000         6003         20.55           7000         7001         23.85           8000         8002         27.20           8500         8500         28.95	3000	3004	10.40	
6000         6003         20.55           7000         7001         23.85           8000         8002         27.20           8500         8500         28.95	4000	4002	13.85	
7000         7001         23.85           8000         8002         27.20           8500         8500         28.95           1000         1023         3.40           2000         2000         6.85           3000         3001         10.35           4000         4000         13.85           5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	5000	5000	17.25	
8000         8002         27.20           8500         8500         28.95           1000         1023         3.40           2000         2000         6.85           3000         3001         10.35           4000         4000         13.85           5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8501         29.05           1000         1027         3.55           7000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60	6000	6003	20.55	
8500         8500         28.95           1000         1023         3.40         RUN: 2         POSITION: 6"           2000         2000         6.85         900         900         900           3000         3001         10.35         900         900         900           4000         4000         13.85         900         900         900         900           6000         6000         20.60         7000         7001         24.05         900         900           8000         8000         27.30         900         900         9"         900           1000         1027         3.55         RUN: 3         POSITION: 9"           2000         2004         6.90         9"         9"           3000         3002         10.35         9"         9"           4000         4010         13.80         900         9001         9"           6000         6003         20.60         7000         7005         24.00           8000         8004         27.30         900         900         900	7000	7001	23.85	
1000         1023         3.40         RUN: 2         POSITION: 6"           2000         2000         6.85         6"           3000         3001         10.35         6"           4000         4000         13.85         5000         5001         17.20           6000         6000         20.60         7000         7001         24.05           8000         8000         27.30         8501         29.05           1000         1027         3.55         RUN: 3         POSITION: 9"           2000         2004         6.90         3000         3002         10.35           4000         4010         13.80         5000         5001         17.10           6000         6003         20.60         7000         7005         24.00           8000         8004         27.30         8004         27.30	8000	8002	27.20	
2000         2000         6.85           3000         3001         10.35           4000         4000         13.85           5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	8500	8500	28.95	
2000         2000         6.85           3000         3001         10.35           4000         4000         13.85           5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30				
3000         3001         10.35           4000         4000         13.85           5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	1000	1023	3.40	RUN: 2POSITION: 6"
4000         4000         13.85           5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	2000	2000	6.85	
5000         5001         17.20           6000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	3000	3001	10.35	
6000         6000         20.60           7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	4000	4000	13.85	
7000         7001         24.05           8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	5000	5001	17.20	
8000         8000         27.30           8500         8501         29.05           1000         1027         3.55           2000         2004         6.90           3000         3002         10.35           4000         4010         13.80           5000         5001         17.10           6000         6003         20.60           7000         7005         24.00           8000         8004         27.30	6000	6000	20.60	
8500         8501         29.05           1000         1027         3.55         RUN: 3         POSITION: 9"           2000         2004         6.90         3000         3002         10.35           4000         4010         13.80         5000         5001         17.10           6000         6003         20.60         20.60         7000         7005         24.00           8000         8004         27.30         27.30         27.30         27.30         20.60	7000	7001	24.05	]
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TM-1043-500: Appendix C	
Revision 0, Page 24 of 24	

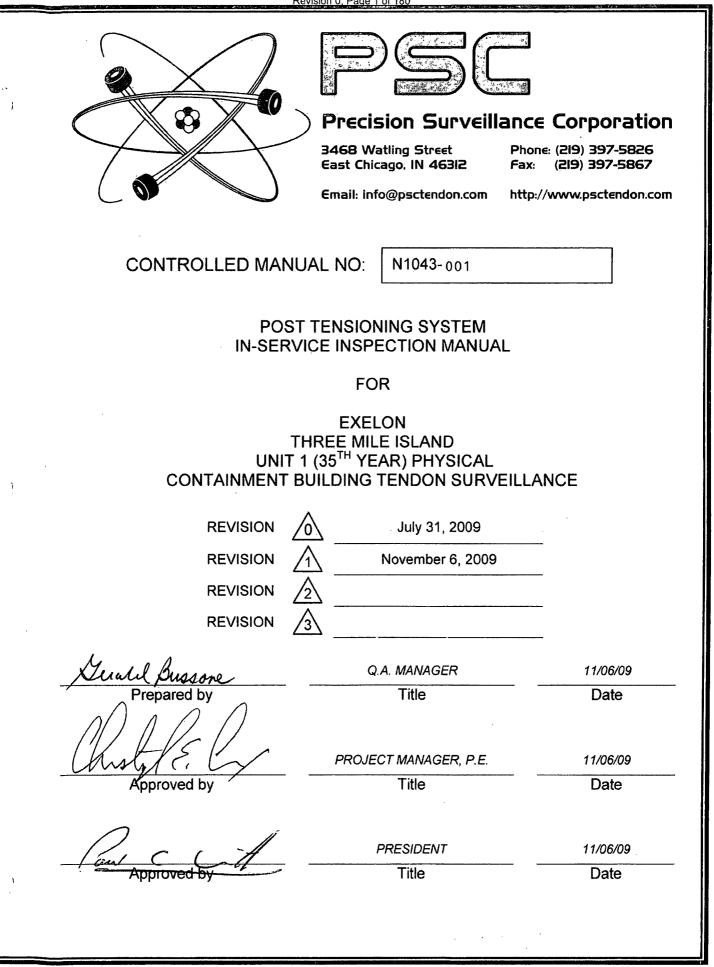


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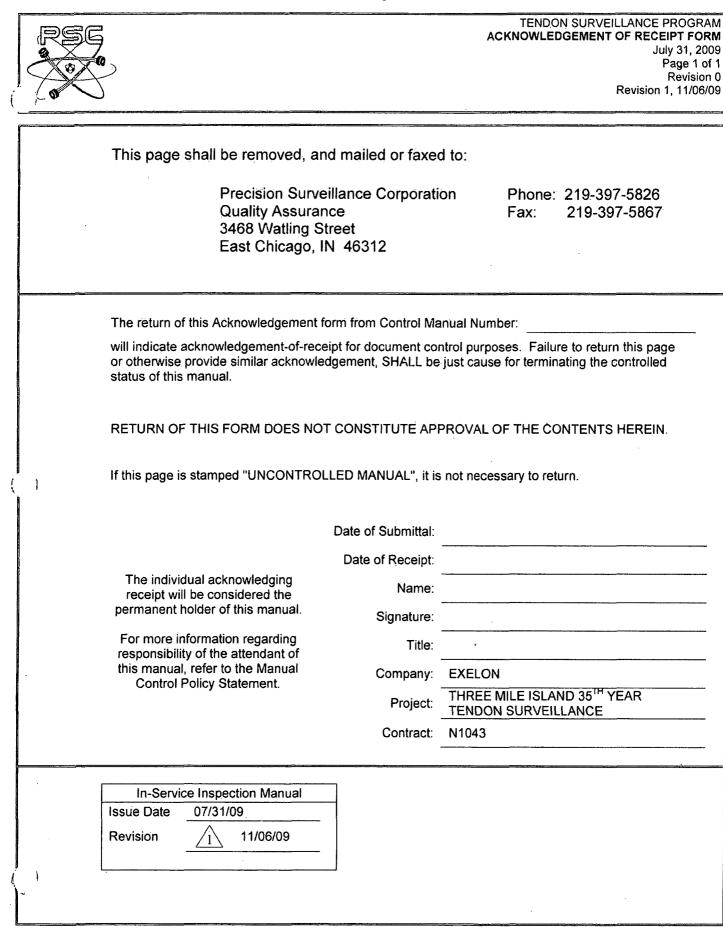
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TM-N1043-500 Appendix D Revision 0, Page 4 of 180





TENDON SURVEILLANCE PROGRAM MANUAL CONTROL POLICY 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 TENDON SURVEILLANCE PROGRAM

#### MANUAL CONTROL POLICY

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

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

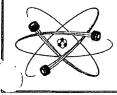
- 1.0 Controlled copies of this manual SHALL be submitted for review and approval according to the distribution and quantity requirements established by the Contract Documents. Where this is not specified, Precision Surveillance Corporation SHALL submit a minimum of one controlled Manual. Where applicable, 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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r TM-N1043-500 Appendix D Revision 0, Page 6 of 180





TENDON SURVEILLANCE PROGRAM INDEX STATUS SHEET July 31, 2009 Page 1 of 3 Revision 0 Revision 1, 11/06/09

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SECTION	PAGES	ORIGIN	AL ISSUE	REVISI	ED STATUS	
SECTION	PAGES	REV.	DATE	Rev.	DATE	
PREFACE						
Title	1	0	07/31/09	1	11/06/09	
Receipt – To be returned	1	0	07/31/09	1	11/06/09	
Manual Control Policy	1-2	0	07/31/09			
Index Status Sheets	1 – 3	0	07/31/09	1	11/06/09	
Revision Control Sheet	1	N/A	07/31/09	1	11/06/09	
Definitions	1 – 5	0	07/31/09		· · · · · · · · · · · · · · · · · · ·	
PSC PS 1.0 – Personnel Safety	1 – 4	0	07/31/09			
1301-9.1 Surveillance Procedure	1 - 8 <u>1</u>	20	07/23/09			
ER-AA-335-018 VT Examination	1 - 32	5	Lev	el 2 Referenc	e use	
1410-Y-83 Tendon Cap Installation	1 - 12	7	Lev	el 2 Referenc	e use	
SURVEILLANCE PROCEDURES		1				
SQ 1.0 – Surveillance Purpose	1 – 2	0	07/31/09			
SQ 2.0 – Surveillance Scope	1 – 3	0	07/31/09			
SQ 3.0 – Construction Equipment List	1 – 2	0	07/31/09			
SQ 4.0 – Q.C. Equipment List	1-3	0	07/31/09			
SQ 5.0 – Prerequisite Checklist	1-2	0	07/31/09	hitten till finn finn till skall som at des data skall som som som		
Checklist Sheet	1	0	07/31/09		<b>999.9</b> , 14.0.	
SQ 6.0 – Grease Cap Removal	1 – 6	0	07/31/09			
Data Sheet 6.0	1	0	07/31/09			
SQ 6.1 – Inspect For Water	1 – 5	0	07/31/09			
Water Notification Letter	1	0	07/31/09			
Data Sheet 6.1	1	0	07/31/09			
SQ 6.2 – Water Sample Analysis	1 – 3	0	07/31/09			
SQ 7.0 – Sheathing Filler Analysis	1-6	0	07/31/09		•	
SQ 7.1 – Thread Measurement	1 – 6	0	07/31/09			
Data Sheet 7.1	1	0	07/31/09			
Appendix 1	1	0	07/31/09			
Appendix 2	1 – 2	0	07/31/09	******		
Appendix 3	1 – 5	0	07/31/09			
Appendix 4	1-3	0	07/31/09		<u> </u>	

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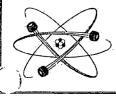
TENDON SURVEILLANCE PROGRAM INDEX STATUS SHEET July 31, 2009 Page 2 of 3 Revision 0 Revision 1, 11/06/09

	Origin		nal Issue	Revised Status		
SECTION	Pages	Rev.	Date	Rev.	Date	
SQ 9.1 – Prestress Forces	1 – 3	0	07/31/09		,	
SQ 10.2 – Test Wire Removal	1 – 6	0	07/31/09			
Data Sheet 10.2	1	0	07/31/09		er en der het Te forhet Willig gehannen en der het het h	
SQ 10.3 – Testing Tendon Wires	1 – 6	0	07/31/09			
Data Sheet 10.3	1	0	07/31/09			
Figure D.1	1	0	07/31/09			
Figure D.2	1	·0	07/31/09		,	
SQ 10.5 – Continuity Test	1-4	0	07/31/09	and the second se		
Data Sheet 10.5	1	0	07/31/09			
Fig 1.0 - Tendon Wire Puller	1	0	07/31/09		na ann an 1979	
SQ 11.1 – PSC Engineering Data	1 – 4	0	07/31/09			
SQ 12.0 – Grease Cap Replacement	1 – 5	0	07/31/09			
Data Sheet 12.0	1	0	07/31/09			
SQ 12.1 – Grease Replacement	1 – 10	0 '	07/31/09			
Figure 1.0 – PSC Y Device	1	0	07/31/09			
Data Sheet 12.1a	1	0	07/31/09			
Data Sheet 12.1b	1	0	07/31/09			
SQ 12.2 – Grease Volumes	1 - 3	0	07/31/09			
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TENDON SURVEILLANCE PROGRAM INDEX STATUS SHEET July 31, 2009 Page 3 of 3 Revision 0 Revision 1, 11/06/09

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SECTION	Pages	Rev.	Date	Rev.	Date	
QUALITY ASSURANCE						
QA 1.0 – Program Purpose	1 – 2	0	07/31/09			
QA 2.0 – Program Scope	1 – 2	0	07/31/09			
QA 3.0 – Quality Organization	1 – 2	0	07/31/09			
QA 4.0 – Q.C. Responsibility	1 – 2	0	07/31/09		· · · · · · · · · · · · · · · · · · ·	
QA 4.1 – Personnel Qualifications	1 – 3	0	07/31/09	1	11/06/09	
Training Verification Letter	. 1	0	11/06/09			
QA 5.0 – Personnel Training	1 – 2	0	07/31/09			
QA 6.0 - Procurement	1 – 2	0	07/31/09			
QA 7.0 - Field Change Request	1 – 3	0	07/31/09	r.		
FCR Form	1	0	07/31/09		e eta lata da seconda en esta de la contra en e	
FCR Index Log	1	0	07/31/09		1	
QA 8.0 – Document Control	1 – 2	0	07/31/09			
QA 8.1 – Revision Control	1 – 5	0	07/31/09			
Revision Control Sheet	1	N/A	07/31/09			
QA 9.0 - Nonconformances	1-5	0	07/31/09			
Tags and Sample Logs	1	0	07/31/09		<b>*</b>	
Sample NC/CA Report	1	0	07/31/09	an agu an shu an		
NC/CAR Form	1	0	07/31/09			
NCR Index Log	1	0	07/31/09			
Hold Tag Index Log	1	0	07/31/09			
Reject Tag Index Log	1	0	07/31/09			
QA 10.0 - Calibrations	1 – 5	0	07/31/09			
QA 10.1 – Calibration Verification	1 – 5	0	07/31/09			
Gauge Calibration Record Form	1	0	07/31/09		·····	
QA 11.0 - Q.C. Inspection	1 – 3	0	07/31/09	**********		
QA 12.0 – Audits	1 – 2	0	07/31/09		<b>47, 1</b> , <u>-</u>	

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TM-N1043-500 Appendix D Revision 0, Page 9 of 180



#### **REVISION CONTROL SHEET**

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Page <u>1</u> of <u>1</u> Revision <u>1</u> Date: <u>11/06/09</u>

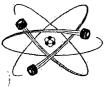
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Title Pag	e	1	11/06/09					
Acknowledge	ment	1	11/06/09					
Index		1-3	11/06/09	11/06/09				
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TM-N1043-500 Appendix D Revision 0, Page 10 of 180





TENDON SURVEILLANCE PROGRAM DEFINITIONS 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 TENDON SURVEILLANCE PROGRAM**

#### DEFINITIONS

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

Title

PRESIDENT

Title

<u>Jerahl Buss</u> Prepared by

Approved by

Approved by

07/31/09 Date

07/31/09

Date

07/31/09

Date

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TENDON SURVEILLANCE PROGRAM DEFINITIONS July 31, 2009 Page 2 of 5 Revision 0

<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.

<u>ANCHORHEAD</u> (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.

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<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.



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<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.

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TENDON SURVEILLANCE PROGRAM DEFINITIONS July 31, 2009 Page 5 of 5 Revision 0

<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.

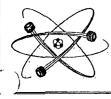
<u>TENDON END ANCHORAGE ASSEMBLY</u>: That portion of the tendon which extends beyond the bearing plate while in a stressed condition which consists of the bearing plate, shim stack, anchor head and wire.

<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.

TM-N1043-500 Appendix D Revision 0, Page 15 of 180



**Precision Surveillance Corporation** 

**PSC PROCEDURE PS 1.0** PERSONNEL SAFETY 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

#### PERSONNEL SAFETY

Ierald Bussone Prepared by

Approved by

PROJECT MANAGER, P.E. Title

Q.A. MANAGER

Title

Approved by

PRESIDENT Title

07/31/09 Date

07/31/09

Date

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Date

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PSC PROCEDURE PS 1.0 PERSONNEL SAFETY July 31, 2009 Page 2 of 4 Revision 0

#### 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.)

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PSC PROCEDURE PS 1.0 PERSONNEL SAFETY July 31, 2009 Page 3 of 4 Revision 0

# 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.

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PSC PROCEDURE PS 1.0 PERSONNEL SAFETY July 31, 2009 Page 4 of 4 Revision 0

# 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.

TM-N1043-500 Appendix D Revision 0, Page 19 of 180



Precision Surveillance Corporation

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

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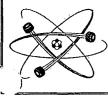
PSC PROCEDURE SQ 1.0 PURPOSE July 31, 2009 Page 2 of 2 Revision 0

#### 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.
- 14.1 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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TM-N1043-500 Appendix D Revision 0, Page 21 of 180





PSC PROCEDURE SQ 2.0 SURVEILLANCE SCOPE 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

#### SURVEILLANCE SCOPE

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Approved by

PROJECT MANAGER, P.E.

Approved

PRESIDENT Title

Q.A. MANAGER

Title

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PSC PROCEDURE SQ 2.0 SURVEILLANCE SCOPE July 31, 2009 Page 2 of 3 Revision 0

#### **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  $169 \frac{1}{4}$ " 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

- 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, 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.



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PSC PROCEDURE SQ 2.0 SURVEILLANCE SCOPE July 31, 2009 Page 3 of 3 Revision 0

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TENDON	END	SQ6.0	SQ6:1	SQ7.0	1301-9.1	SQ10.2	SICA 80103	1301-9.1	SQ12.1	COMMENTS
H13-41	BT1 & BT3	•	•	•	٠				۲	
H24-33	BT2 & BT4	٠	٠	•	•					
H46-50	BT4 & BT6	•	•	٠	٠				۲	
H51-49	BT1 & BT5	•	٠	٠	•	•	•	۲	•	DETENSION
H62-26	BT2 & BT6	•	٠	٠	•				٠	COMMON
										• •
V-11	TOP/BOT	•	۲	٠	٠				۲	
V-32	TOP/BOT	•.	٠	•	۲				٠	COMMON
V-90	TOP/BOT	•	۲	٠	٠	۲		٠	٠	DETENSION
V-132	TOP/BOT	Ö	•	•	•				٠	
D-122	-	•		•	•				٠	
D-225		•	•	•	٠				٠	COMMON
D-322		•.	٠	•	٠	٠	•	•	٠	DETENSION
D-342		•	٠	•	•				٠	COMMITMENT FROM 30 TH YEAR

SQ 6.0 – GREASE CAP REMOVAL SQ 6.1 – INSPECTION FOR WATER SQ 7.0 – GREASE SAMPLE ANALYSIS 1301-9.1 – TMI PROCEDURES LEGEND

SQ 10.2 – TENDON WIRE INSPECTION SQ 10.3 – TESTING TENDON WIRES 1301-9.1 – RETENSION TENDONS SQ 12.1 – GREASE REPLACEMENT

#### 3.0 EXPLANATION

- 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.

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TM-N1043-500 Appendix D Revision 0, Page 24 of 180





PSC PROCEDURE SQ 3.0 CONSTRUCTION EQUIPMENT LIST 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

## CONSTRUCTION EQUIPMENT LIST

Jerald Bussone Prepared by

Church E C

Approved by

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PROJECT MANAGER, P.E.

Q.A. MANAGER

Title

Title

PRESIDENT Title

07/31/09

07/31/09

Date

07/31/09

Date

Date

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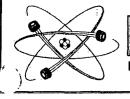
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PSC PROCEDURE SQ 3.0 CONSTRUCTION EQUIPMENT LIST July 31, 2009 Page 2 of 2 Revision 0

#### 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).

TM-N1043-500 Appendix D Revision 0, Page 26 of 180





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

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Approved by

Approved by

Q.A. MANAGER Title

PROJECT MANAGER, P.E.

Title

PRESIDENT

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07/31/09 Date

07/31/09

Date

07/31/09

Date

13 SQ 4.0 TM.09 ISI.doc



PSC PROCEDURE SQ 4.0 Q.C. EQUIPMENT LIST July 31, 2009 Page 2 of 3 Revision 0

### 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.

13 SQ 4.0 TM.09 ISI.doc



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.

TM-N1043-500 Appendix D Revision 0, Page 29 of 180





**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**

Prepared by

Approved by

Approved by

PROJECT MANAGER, P.E. Title

Q.A. MANAGER

Title

PRESIDENT Title

07/31/09 Date

07/31/09

Date

07/31/09

Date

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

### 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.

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

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	CHECKLIST			
ITE		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		

14 SQ 5.0 TM.09 ISI.doc

TM-N1043-500 Appendix D Revision 0, Page 32 of 180





**PSC PROCEDURE SQ 6.0 GREASE CAP 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

# **GREASE CAP REMOVAL**

Prepared by

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Approved b

PROJECT MANAGER, P.E. Title

Q.A. MANAGER

Title

PRESIDENT Title

07/31/09 Date

07/31/09

Date

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Date

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PSC PROCEDURE SQ 6.0 GREASE CAP REMOVAL July 31, 2009 Page 2 of 6 Revision 0

# 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.

15 SQ 6.0 TM.09 ISI.doc



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PSC PROCEDURE SQ 6.0 GREASE CAP REMOVAL July 31, 2009 Page 3 of 6 Revision 0

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 **QCD** 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 **QCD** 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 <u>QCD</u> 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.

15 SQ 6.0 TM.09 ISI.doc



PSC PROCEDURE SQ 6.0 GREASE CAP REMOVAL July 31, 2009 Page 4 of 6 Revision 0

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 **QCD** 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 **QCD** 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.

15 SQ 6.0 TM.09 ISI.doc



PSC PROCEDURE SQ 6.0 GREASE CAP REMOVAL July 31, 2009 Page 5 of 6 Revision 0

- 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.



PSC PROCEDURE SQ 6.0 GREASE CAP REMOVAL July 31, 2009 Page 6 of 6 Revision 0

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- 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 **QCD** 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 **QCD** 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.

TM-N1043-500 Appendix D Revision 0, Page 38 of 180

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		DEEDURE SQ 6.0 E 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:	Field
	Grease Cap Removal	
(7.5)Date Removal Star	ted:	Q.C. Signoff
(7.6) Dry Ice Used on G	rease Cap and/or Anchorage	
(7.7) Temp. of Concrete	: °F Thermometer No.: Re-Cal Date:	
Ambient Temp.:	•F Thermometer No.: Re-Cal Date:	1 1 1
(8.4) Anchorhead I.D. :	Anchorhead Verification: Match No-Match	
(8.5) Grease Coating	· · · · · · · · · · · · · · · · · · ·	
Grease Cap -	Complete Partial Uncoated %	L 1 8 8
Buttonheads -	Complete Partial Uncoated %	
Anchorhead -	Complete Partial Uncoated %	2 9 1
Shims -	Complete Partial Uncoated %	
Bearing Plate – ⁽¹⁾	Complete Partial Uncoated %	
(8.7) Grease Color Mato Comme		
(8.8) Quantity of Sample Location of Removal	Quart Samples identified per Step 8.8.1?  Yes No A.H. B.P. Shims Cap Duct	, , ,
(8.9) Qty. of Grease lost	during removal of cap: gal.	
	to be reused? Yes No Qty. of Grease removed from cap: gal.	
(9.6) Qty. of Grease rem	oved from anchorage: gal.	1 1 1
(9.7) Damage during cap	o removal or anchorage cleaning?	المعادم معادم م المعادم معادم م و
(10.3) Method of Tendor	Protection:	
(10.4) Amount of Grease	a Loss from Tendon duct: gal.	
	Dest grease (below): + (8.9.1)+ (9.6)+ (10.4) = TOTAL AL grease lost on Data Sheet 12.1, GREASE REPLACEMENT.	
C Reviewed:	Level: Date:	
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TM-N1043-500 Appendix D Revision 0, Page 39 of 180





**PSC PROCEDURE SQ 6.1 INSPECT FOR WATER** 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

# **INSPECT FOR WATER**

Prenared hy

Q.A. MANAGER Title

PROJECT MANAGER, P.E.

Title

07/31/09 Date

07/31/09

Date

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Approved by

Approved by

Title

PRESIDENT

07/31/09 Date

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PSC PROCEDURE SQ 6.1 INSPECT FOR WATER July 31, 2009 Page 2 of 5 Revision 0

# 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

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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 **QCD** 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.



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- 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)

16 SQ6.1.TM.09 ISI.doc



- 9.5.1 **QCD** 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 **<u>QCD</u>** 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 **<u>QCD</u>** 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 <u>QCD</u> 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.

16 SQ6.1.TM.09 ISI.doc



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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 **QCD** 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

	E Contraction of the second se		IN	PROCEDURE SQ 6.1 SPECT FOR WATER IFICIATION LETTER July 31, 2009 Page 1 of 1 Revision 0
To:			n en	
Subject:	PSC Procedure SQ 6.1: Inspect for Water			
Project:	TMI 35 TH YEAR TENDON SURVEILLANCE	[] l	JNIT 1	
Tendon No	Tendon End:		Shop	Field
	Notificatio	on of Water		
regardless detected re	ocedure SQ 6.1 Section 11, "Exelon shall be noti of quantity, has been detected during the In-Servi ferencing Section 10 of this Procedure and the sp	ce Inspection. This Not ecific quantity detected	ification shall define	en water, the condition
i nis letter is	s to notify you that water was found in the tendon	mentioned above.		
Quantity	of Sample obtained:		_	
Descript	ion of Condition:			
Per PSC Pr	ocedure 6.1 Section 10, the observed water is ca	tegorized as follows:	<u> </u>	
	Section 10.1.1 – OBSERVABLE MOISTURE			
	"Observable Moisture" is defined a observed by the Inspector to be co tendon anchorage assembly. While associated with condensation, it co	ncentrated, collected o e this is intended to des	r draining out from the scribe that moisture of that moisture of the scribe that moisture of the scribe that moist	he grease cap or condition
	Section 10.1.2 – SIGNIFICANT MOISTURE			
	"Significant Moisture" is defined to collected, concentrated or observe grease cap. This quantity is consid condensation.	d to be draining out of t	he tendon anchorag	e assembly or
Signature		Level:	Date:	

16 SQ6.1.TM.09 ISI.doc

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TM-N1043-500 Appendix D Revision 0, Page 45 of 180

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Project: TMI 35 TH YEAR	TENDON SURVEILLANCE	UNIT 1	Rynnin ar an	¢ht <u>her in an an an an a</u> s a bh <u>a</u> nn an a a a
(8.1) Tendon No.:	Tendon	End:	Shop	Field
(9.5.1) DURING REMOVA Water Detected: Moisture Description: Comments:	Yes No Quantity: Observable Moisture	Sample Taken:	☐ Yes [ ☐ Not Appli	] No [] N cable
(9.6.1) INSIDE GREASE C Water Detected: Moisture Description: Comments:	AP Yes No Quantity: Observable Moisture	Sample Taken:	☐ Yes [ ☐ Not Appli	] No [] N cable
(9.7.1) AROUND TENDON Water Detected: Moisture Description: Comments:	ANCHORAGE COMPONENTS	Sample Taken:	<b>—</b>	] No 门 N cable
Comments:	Yes No Quantity: Observable Moisture	Sample Taken:	Not Appli	
(11.1) NOTIFICATION Exelon Notifie	d: 🗌 Yes 🗌 No Individual	Name:	Date	9:
SAMPLE IDENTIFICATION (12.2) Samples adequ	AND STORAGE uately identified:  Yes  No mples stored at:			
)QC Signoff:		Level:	_ Date:	
			_ Date:	

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TM-N1043-500 Appendix D Revision 0, Page 46 of 180





PSC PROCEDURE SQ 6.2 WATER SAMPLE 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

# WATER SAMPLE ANALYSIS

<u>Inall Bussone</u> Prepared by

Chustenh E. Con

Approved by

Title

Approved b

PRESIDENT Title

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

07/31/09

07/31/09

Date

07/31/09

Date

Date

17 SQ 6.2 TM.09 ISI.doc



PSC PROCEDURE SQ 6.1 INSPECT FOR WATER July 31, 2009 Page 2 of 5 Revision 0

# 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 **QCD** 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.



PSC PROCEDURE SQ 6.2 WATER SAMPLE July 31, 2009 Page 2 of 3 Revision 0

### 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.

17 SQ 6.2 TM.09 ISI.doc



PSC PROCEDURE SQ 6.2 WATER SAMPLE July 31, 2009 Page 3 of 3 Revision 0

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.

TM-N1043-500 Appendix D Revision 0, Page 50 of 180



PSC PROCEDURE SQ 7.0 SHEATHING FILLER ANALYSIS July 31, 2009 Page 1 of 6 Revision 0

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IN-SERV	EILLANCE CORPORATION ICE INSPECTION NTROL PROCEDURE	
SHEATHING	G FILLER ANALYSIS	
Gerald Bussone	Q.A. MANAGER	07/31/09
Prepared by	Title	Date
Approved by	PROJECT MANAGER, P.E. Title	07/31/09 Date
Cour c iff	PRESIDENT	07/31/09
Approved by	Title	Date



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PSC PROCEDURE SQ 7.0 SHEATHING FILLER ANALYSIS July 31, 2009 Page 2 of 6 Revision 0

# 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.

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PSC PROCEDURE SQ 7.0 SHEATHING FILLER ANALYSIS July 31, 2009 Page 4 of 6 Revision 0

- 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 (Cl) 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.

18 SQ7.0.TM.09 ISI.doc



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

$$TBN = \frac{[(20)x(NA) - (B)x(NB)]}{W} \times 56.1$$

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>

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- 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 (H₂O) 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.

TM-N1043-500 Appendix D Revision 0, Page 56 of 180





PSC PROCEDURE SQ 7.1 THREAD MEASURING July 31, 2009 Page 1 of 6 Revision 0

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PSC PROCEDURE SQ 7.1 THREAD MEASURING July 31, 2009 Page 2 of 6 Revision 0

### 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").



PSC PROCEDURE SQ 7.1 THREAD MEASURING July 31, 2009 Page 3 of 6 Revision 0

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.



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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.

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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.)

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TM-N1043-500 Appendix D Revision 0, Page 61 of 180



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

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- 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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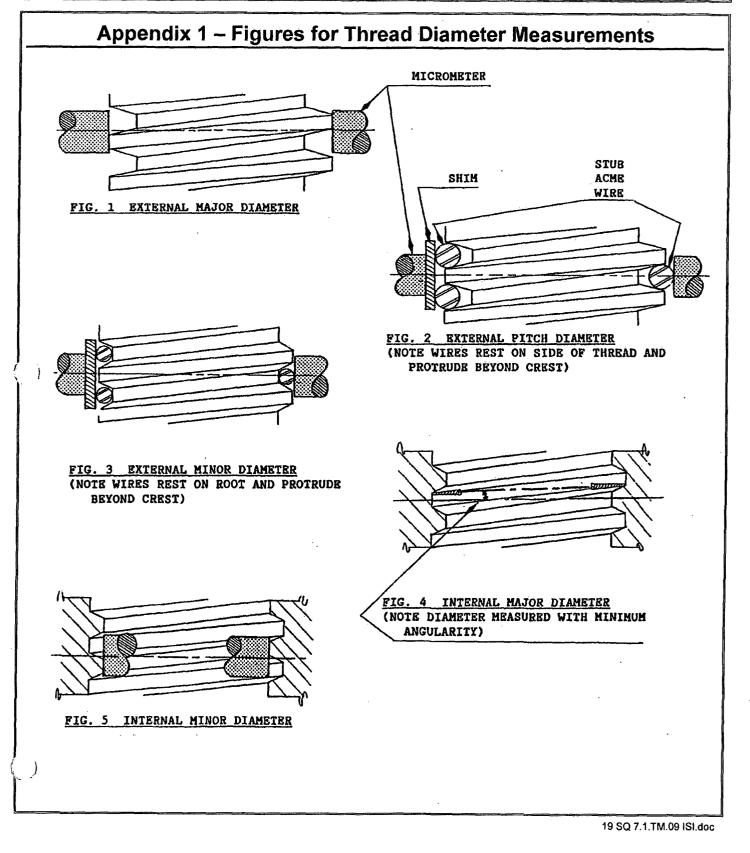
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PSC PROCEDURE SQ 7.1 THREAD MEASUREMENT – APPENDIX 1 July 31, 2009 Page 1 of 1 Revision 0





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	1277		.1333	.182	.1368	.200	.1403	.217	.1438	.235
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	.1311		.1348	.189	1382	.207	.1417	.224	.1452	.242
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	1318		.1353	.192	.1388	.210	.1423	.227	.1458	.245
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	1322		.1357	. 194	.1392	.212	.1427	.229	.1462	. 247
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## Pitch Diameter for 3 Wire Method

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

WIRE		WIRE		WIRE		WIRE		WIRE	
SIZE	CON.	SIZE	CON.	SIZE	CON.	SIZE	CON.	SIZE	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
.1469	.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	. 253	-1509	.270	.1544	.288	.1579	. 305	.1614	.323
.1475	.253	.1510	. 271	.1545	.288	.1580	.306	.1615	.323
. 1476	. 254	.1511	.271	.1546	.287	.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
.1484	.258	.1519	.275	.1554	.293	<b>.</b> 1589	.310	.1624	. 328
.1485	.258	.1520	.276	.1555	. 293	.1590	.311	.1625	.328
.1486	.259	.1521	. 276	.1556	.294	.1591	.311	.1626	.329
<b>.</b> 1487	- 259	-1522	.277	.1557	<u>.</u> 294	.1592	.312	.1627	.329
<b>.</b> 1488	- 260	.1523	.277	.1558	.295	.1593	.312	.1628	.330
.1489	.260	-1524	.278	.1559	- 295	.1594	.313	.1629	.330
.1490	. 261	.1525	. 278	.1560	. 296	.1595	.313	.1630	. 331
.1491	.261	.1526	. 279	.1561	. 298	- 1596	.314	. 1631	.331
.1492	. 262	.1527	.279	.1562	.297	.1597	.314	.1632	.332
.1493	.262	.1528	.280	.1563	. 297	.1598	.315	. 1633	.332
<b>.</b> 1494	.263	.1529	.280	-1564	.298	.1599	.315	.1634	. 333
.1495	. 263	.1530	.281	.1565	<b>.</b> 298	. 1600	.316	.1635	.333
.1496	.264	.1531	.281	.1566	.299	.1601	.316	.1636	.334
.1497	. 264	.1532	.282	.1567	.279	.1602	.317	.1637	.334
.1498	.265	.1533	.282	.1568	.300	.1603	.317	.1638	. 335
.1499	.265	.1534	.283	.1569	.300	-1604	.318	.1639	.335

19 SQ 7.1.TM.09 ISI.doc

TM-N1043-500 Appendix D Revision 0, Page 66 of 180



	v															
	•	E	XTERNAL	HREADS		>	<	II	NTERNAL	THREADS		>				
			PITCH DI MAX		MINOR DI MAX		MAJOR DI MIN		PITCH DI MIN		MINOR D MIN	IAMETER MAX	STRESS AREA	SHEAR		•
	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	.	Ъ
	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		Ap
	0.7500	0.7375	0.6681	0.6479	0.5800	0.5598	0.7700	0.7902	0.6750	0.6952	0.6000	0.6125	0.2864	1.0922		00
	0,8750	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		pendi
	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		X
	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		ယ
	1.2500	1.2375	1.1661	1.1443	1.0800	1.0583	1.2700	1.2917	1.1750	1. 1967	1.1000	1.1125	0.9526	1.9160	4 Pi	<u> </u>
	1.3750	1.3625	1.2906	1.2686	1.2050	1-1830	1.3950	1.4170	1.3000	1.3220	1.2250	1.2375	1.1801	2.1208		
	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		õ
	1.6250	1.6125	1.5398	1.5172	1.4550	1.4324	1.6450	1.6676	1.5500	1.5726	1.4750	1.4875	1.7082	2.5293	ð	P
	1.7500	1.7375	1.6644	1.6415	1.5800	1.5571	1.7700	1.7929	1.6750	1.6979	1.6000	1.6125	2.0088	2.7330		σ
	1.8750	1.8625	1.7890	1.7658	1.7050	1.6818	1.8950	1.9182	1.8000	1.8232	1.7250	1.7375	2.3338	2,9363	Thre	Ňa
	2.0000	1.9875	1.9137	1.8902	1.8300	1.8065	2.0200	2.0435	1.9250	1.9485	1.8500	1.8625	2.6833	3.1393		ē
	2,1250	2.1125	2.0383	2.0146	1.9550	1.9313	2.1450	2.1687	2.0500	2.0737	1.9750	1.9875	3.0571	3.3419	- A.[	<b>e</b>
	2.2500	2.2375	2.1630	2.1390	2.0800	2.0560	2.2700	2.2940	2.1750	2.1990	2.1000	2.1125	3.4554	3.5441	Class	D
	2.3750	2.3625	2.2877	2.2634	2.2050	2.1808	2.3950	2.4192	2.3000	2.3242	2.2250	2.2375	3.8780	3.7461	s 2G	Ĩ
	2,5000	2.4875	2.4124	2.3879	2.3300	2,3055	2.5200	2.5445	2.4250	2.4495	2,3500	2.3625	4.3251	3.9477		ameter
	2.6250	2.6125	2.5370	2.5123	2.4550	2.4303	2.6450	2.6697	2.5500	2.5747	2.4750	2.4875	4.7967	4.1490		
	2.7500	2.7375	2.6617	2.6368	2.5800	2.5551	2.7700	2.7949	2.6750	2.6999	2.6000	2.6125	5.2926	4.3499		Range
	2.8750	2.8625	2.7864	2.7613	2.7050	2.6798	2.8950	2.9202	2.8000	2.8252	2.7250	2.7379	5-8130	4.5506		ju (
	3.0000	2.9875	5 2.9111	2.8858	2.8300	2.8046	3.0200	3.0454	2.9250	2.9504	2.8500	2.8625	6.3578	4.7510		Q
	3.1250	3.1129	3.0359	3.0103	2.9550	2.9294	3.1450	3.1706	3.0500	3.0756	2.9750	2.9875	6.9271	4.9511		S
	3.2500	3.2375	5 3.1606	3.1348	3.0800	3.0542	3.2700	3.2958	3.1750	3.2008	3.1000	3.1129	5 7.5208	5.1509		
	3.3750	3.362	5 3,2853	3.2593	3.2050	3.1790	3.3950	3.4210	3.3000	.3.3260	3.2250	3.237	5 8, 13,89	5-3504		
	3. 5000	3.487	5 3.4100	3.3838	3.3300	3.3038	3.5200	3:5462	3.4250	3.4512	3.3500	3.362	5 8.7815	5.5496		
	3.6250	3.312	5 3.5348	3.5083	3.4550	3.4286	3.6450	3.6714	3.5500	3.5764	3.4750	5 3.487	5 9.4485	5.7485		
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TM-N1043-500 Appendix D Revision 0, Page 67 of 180



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

v															[	
v	<	IAMETER MIN	XTERNAL T PITCH DI NAX		MINOR DI MAX		< Hajor D: Hin		NTERNAL PITCH DI MIN		MINOR D MIN		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	1	1
	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	6.343B		~
	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	1	Pp
i	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
	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		ppendix
	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		ĬX
	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		ယ
	4.7500	4.2375	4.6576	4.6295	4.5800	4.5517	4.7700	4.7981	4.6750	4.7031	4.6000	4.6125	16.5519	7.5276	4 PI	1
ļ	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	rc <u>5</u>	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	Stub	S
;	5.1250	5.1125	5.0319	5.0033	4.9550	4.9264	5,1450	5.1736	5.0500	5.0786	4.9750	4.9875	19.3599	8.1162	Å	All
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	M	0
	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	T	Š
i	5.5000	5.4875	5.4062	5.3772	5.3300	5.3009	5.5200	5.5491	5.4250	5.4541	5.3500	5.3625	22.3881	8.7027	ads	abl
	5.6250	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	Λ	e
ł	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	Dia
	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	is 2(	am
	6.0000	5.9875	5.9054	5,8757	5.8300	5.8003	6,0200	6.0497	5.9250	5.9547	5.8500	5.8625	26.7682	9.4817	62	et
	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		R
	6.3750	6.3625	6.2798	6.2497	6.2050	6.1749	6.3950	6.4251	6.3000	6.3301	6.2250	6.2375	30.3101	10.0637		an
	6.5000	6.4875	6.4046	6.3743	6.3300	6.2997	6.5200	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		S
	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	5-8950	6.9257	6.8000	6.8307	6.7250	6.7375	35.3753	10.8369		
	7.0000	6.9875	6.9038	6,8730	6.8300	6.7991	7.0200	7.0509	6.9250	6.9559	6.8500	6.6625	36.7028	11.0296		
	7.1250	7.1125	7.0286	6,9976	6.9550	6.9240	7.1450	7.1760	7.0500	7.0910	6.9750	6.9875	38.0548	11.2222	:	
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and the second second			والكرافي والمتعادين			and the second secon	وراديني والمتعارية واعتقالته	م <del>اد میں بر زیرار در مرتباط میں م</del> عالات							1	

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TM-N1043-500 Appendix D Revision 0, Page 68 of 180

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

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_<		E)	CIERNAL T	HKEADS -		> <	~~~	IN	LIERNAL I	NKCHUS -		/			1	
	MAJOR D Max		PITCH DI MAX		MINOR DI MAX	ANETER	MAJOR DI HIN	AMETER	PITCH DI MIN	AMETER MAX	MINOR DI MIN	AMETER MAX	STRESS	SHEAR		
	7.2500	7.2375	7.1535	7.1223	7.0800	7.0488	7.2700	7.3012	7.1750	7.2062	7.1000	7.1125	39.4312	11.4146	1	
	7.3750	7.3625	7.2783	7.2470	7.2050	7.1737	7.3950	7.4263	7.3000	7.3313	7.2250	7.2375	40.8321	11.6068	[	
	7.5000	7.4875	7.4031	7.3717	7.3300	7.2986	7.5200	7.5514	7,4250	7.4564	7.3500	7.3625	42.2575	11.7988	1	$\triangleright$
	7.6250	7.6125	7.5279	7.4963	7.4550	7.4234	7.6450	7.6766	7.5500	7.5816	7.4750	7.4875	43.7073	11.9906		p
	7.7500	7.7375	7.6527	7.6210	7.5800	7.5483	7.7700	7.8017	7.6750	7.7067	7.6000	7.6125	45.1817	12.1822		ppendix
	7.8750	7.8625	7.7776	7.7457	7.7050	7.6732	7.8950	7.9268	7.8000	7.8318	7.7250	7,7375	46.6805	12.3737		d
	8.0000	7.9875	7.9024	7.8704	7.8300	7.7980	8.0200	8.0520	7.9250	7.9570	7.8500	7.8625	48,2038	12.5649		
	8.1250	8.1125	8.0272	7.9951	7.9550	7.9229	8.1450	B.1771	8.0500	8.0821	7.9750	7,9875	49.7515	12.7560	4	ယ ၊
	8.2500	8.2375	8.1520	8.1198	8.0800	8.0478	8.2700	8.3022	8.1750	8.2072	8.1000	8,1125	51.3238	12.9469	Pitch	ż
	8.3750	8,3625	8.2768	8.2445	8.2050	8.1726	8.3950	8.4274	8.3000	8.3324	8.2250	8.2375	52.9205	13.1375	Ś	
	8.5000	8.4875	8.4017	8.3692	8.3300	8.2975	8.5200	8.5525	8.4250	8.4575	8.3500	8,3625	54.5417	13.3281	tub	S
	8. 3250	8.3125	8.5265	8.4939	8.4550	8.4224	8.6450	8.6776	8.5500	8.5826	8.4750	8.4875	56.1874	13.5184	ACME	R
	8.7500	8.7375	8.6513	8.6186	8.5800	8.5473	8.7700	8.8027	8.6750	8.7077	8.6000	8.6125	57.8575	13.7086		Ş
	8.8750	8,8625	8,7762	8.7433	8.7050	8.3721	8.8750	8.9279	8.8000	8.8329	8.7250	8.7375	59.5522	13.8985	Threa	Allowable
	9-0000	8.9875	8.9010	8.8680	8.8300	8.7970	9.0200	9.0530	8,9250	8.9580	8.8500	8.8525	61.2713	14.0883	ads	<b>D</b>
	9.1250	9.1125	9.0258	8.9927	8.9550	8.9219	9.1450	9.1781	9.0500	9.0831	8.9750	8,9875	63.0149	14.2780	^ 0	Ö
ĺ	9.2500	9.2375	9.1507	9.1174	9.0800	9.0468	9.2700	7.3032	9,1750	9.2082	9.1000	9,1125	64.7830	14.4674	lass	Jia
	9.3750	9.3625	9.2755	9.2421	9.2050	9.1716	9.3950	7.4284	9.3000	9.3334	9.2250	9.2375	66.5756	14.6567	2G	liame
,	9.5000	9.4875	9.4003	9.3668	9.3300	9.2965	9.5200	9,5535	9.4250	9.4585	9.3500	9,3625	68.3926	14.8458	• •	ete
	9.6250	9.6125	9.5252	9.4916	9.4550	9.4214	9.6450	9.6786	9.5500	9.5836	9.4750	9.4875	70.2342	15.0347		
	9.7500	9.7375	9.6500	9.6163	9.5800	9.5463	9.7700	9-8037	7.6750	9.7087	9.6000	9.6125	72.1002	15.2235		Ranges
	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		le
	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	2 15.7888		S
	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	5 16.1649		
	10.5000	10.4875	10.3991	10.3646	10.3300	10.2956	10.5200	10.5544	10.4250	10.4594	10.3500	10.3625	83.810	5 16.3526		1
	10.3250	10.6125	10.5239	10.4894	10.4550	10,4204	10.6450	10.6796	10,5500	10.5946	10.4750	10,4875	85.848	0 16.5403		
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TM-N1043-500 Appendix D Revision 0, Page 69 of 180



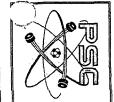
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AREA Appendix Ċ.S 4 I Pitch NB S Õ đub Allowable ACME Threads Diameter C ass 2G Ranges

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TM-N1043-500 Appendix D Revision 0, Page 70 of 180



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Allowable

Diameter

Range

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4 Pitch Stub ACME Threads

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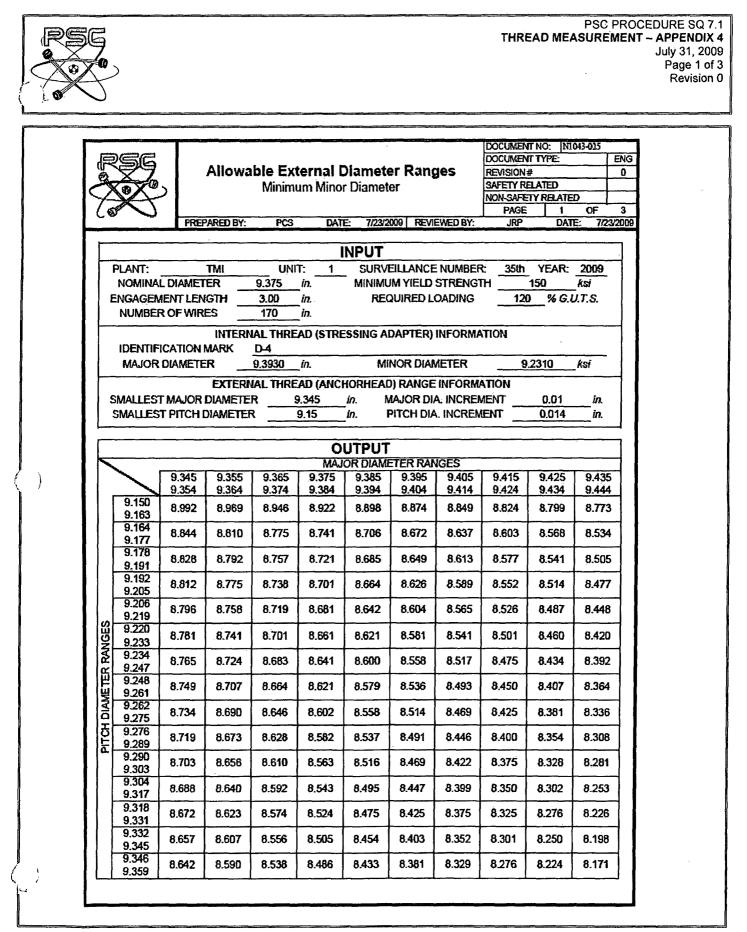
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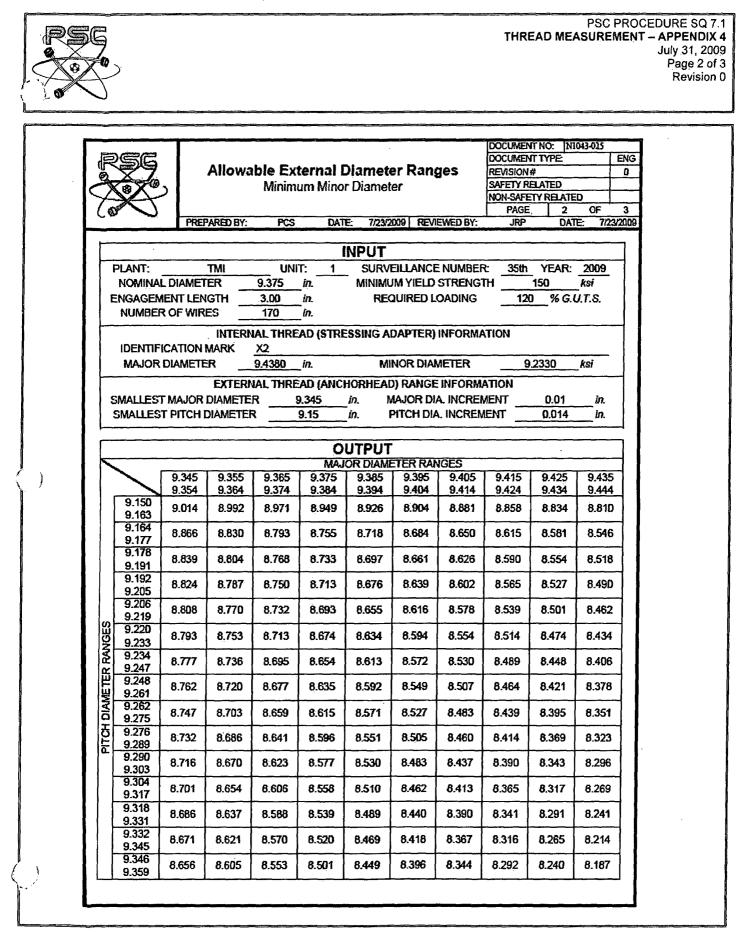
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TM-N1043-500 Appendix D Revision 0, Page 71 of 180



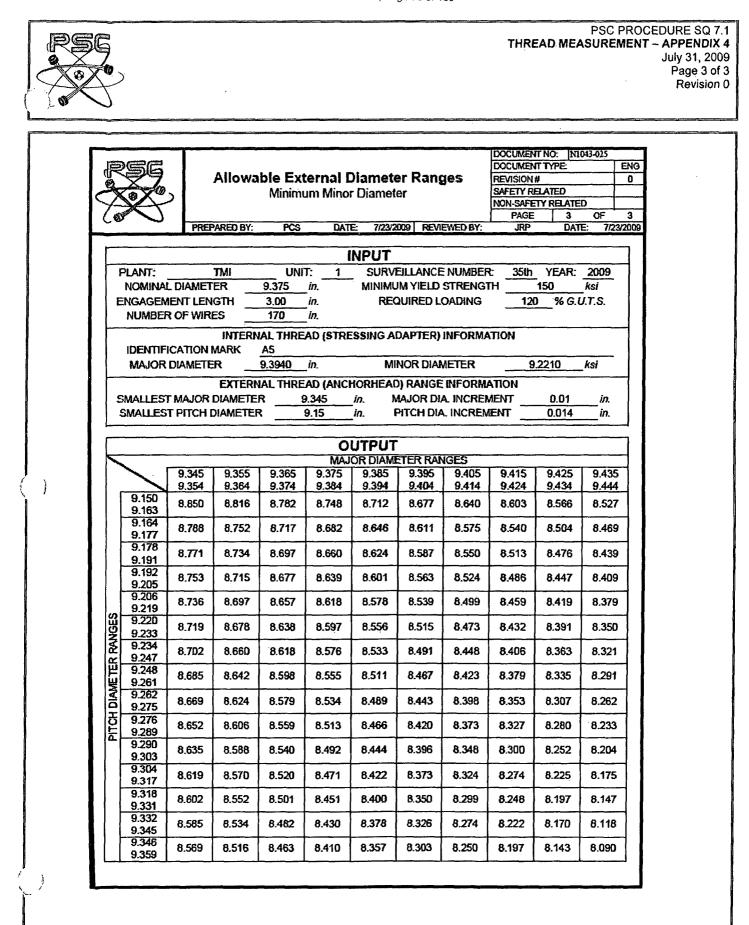
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TM-N1043-500 Appendix D Revision 0, Page 72 of 180



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TM-N1043-500 Appendix D Revision 0, Page 73 of 180



TM-N1043-500 Appendix D Revision 0, Page 74 of 180



PSC PROCEDURE SQ 9.1 PRESTRESS FORCES July 31, 2009 Page 1 of 3 Revision 0

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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 **PRESTRESS FORCES** QA MANAGER 07/31/09 Title Date repared by PROJECT MANAGER, P.E. 07/31/09 Title Approved by Date PRESIDENT 07/31/09 Title Date Approved by 20 SQ9.1.TM.09 ISI.doc



PSC PROCEDURE SQ 9.1 PRESTRESS FORCES July 31, 2009 Page 2 of 3 Revision 0

#### 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 pedicted lower limit (PLL), 90% of predicted lower limit (.9 PLL), 95% of predicted loser limit (.95PLL) and Normalization Factor forces to be used during the 35th year inspection are listed below for each UNIT 1 tendon scheduled for monitoring of force. The same information is provided for the adjacent tendons.



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PSC PROCEDURE SQ 9.1 PRESTRESS FORCES July 31, 2009 Page 3 of 3 Revision 0

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	Table	23970	11= <b>80</b> (	Diff The	i/ Celleulai	N⇔auoi	hit 1 Te	erobr	
TENDON	LOWER LIMIT LIFTOFF FORCE (PLL)	95% LOWER LIMIT LIFTOFF FORCE (9PLL)	90% LOWER LIMIT LIFTOFE FORCE (:95PLL)	NORMALIZATION	TENDON	LOWER LIMIT LIFTOFF FORCE (PLL)	95% LOWER LIMIT LIETOEF FORCE (9PLL)	90% LOWER LIMIT LIFTOFF FORCE (-95PLL)	NOPMAL 17A-TIGN
H13-40	1096	1041	986	+11	V-10	1172	<u>الأركب من المركب الم</u> 1113	1055	<u>lt</u>
H13-41	1153	1095	1038	-47	V-11	1148	1091	1033	· 4
H13-42	1095	1040	986	+12	V-12	1189	1130	1070	-
H24-32	1120	1064	1008	-13	V-31	1174	1115	1057	
H24-33	1068	1015	961	+38	V-32	1181	1122	1063	
H24-34	1119	1063	1007	-12	V-33	1222	1161	1100	-
H46-49	1035	983	932	+72	V-89	1185	1126	1067	
H46-50	1116	1060	1004 [.]	-9	V-90	1204	1144	1084	-
H46-51	1038	986	934	+69	V-91	1165	1107	1049	
H51-48	1076	1022	968	+31	V-131	N/A	N/A	N/A	Ņ
H51-49	1132	1075	1019	-25	V-132	1204	1144	1084	-
H51-50	1079	1025	971	+27	V-133	N/A	N/A	N/A.	N
H62-25	1060	1007	954	+46					
H62-26	1105	1050	995	+2					
H62-27	1059	1006	953	+47	_				
D-121	1060	1007	954	+52					
D-122	1082	1028	974	+31					
D-123	1127	1071	1014	-15					
D-224	1109	1054	998	+5					
D-225	1067	1014	960	+45					
D-226	1087	1033	978	+26					
D-321	1056	1003	950	+57					
D-322	1,128	1072	1015	-15					
D-323	1145	1088	1031	-33					
D-341	1091	1036	982	+22					
D-342	1116	1060	1004	-3:					
D-343	1151	1093	1036	-38	[				

N/A, DATA NOT CURENTLY AVAILABLE

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TM-N1043-500 Appendix D Revision 0, Page 77 of 180



**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**

Prepared by

Approved by

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PROJECT MANAGER, P.E. Title

> PRESIDENT Title

Q.A. MANAGER

Title

07/31/09 Date

07/31/09

Date

07/31/09

Date



PSC PROCEDURE SQ 10.2 TEST WIRE REMOVAL July 31, 2009 Page 2 of 6 Revision 0

#### 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

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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.



PSC PROCEDURE SQ 10.2 TEST WIRE REMOVAL July 31, 2009 Page 3 of 6 Revision 0

- 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 value 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.



PSC PROCEDURE SQ 10.2 TEST WIRE REMOVAL July 31, 2009 Page 4 of 6 Revision 0

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- 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 <u>QCD</u> 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.



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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 ACCEPTABLE WIRE

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

#### 8.5.4.4.2 BROKEN WIRE

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

#### 8.5.4.4.3 UNACCEPTABLE CATEGORY OF CORROSION CONDITION

- 8.5.4.4.3.1 If Unacceptable Category of Corrosion Condition Wires require testing, at least one specimen shall be tested, with that sample being taken from what is judged to be the worst representative section of the wire length. Other samples may be selected and/or tested at the request of TMI Engineering.
- 8.5.4.5 If the wire testing is to be performed on site, it shall be acceptable to cut the 3 sample wires while the wire is being pulled out and coiled. Refer to PSC Procedure SQ 10.3 for the control and documentation requirements. The sample shall be cut from each end and the middle of the wire and as cited in Section 8.5.4.4.1.1 above and shall be about 10' long, unless the wires are to be cut to the required testing length.
- 8.5.4.6 Sample selection shall include areas representative of the most significant Category of Corrosion if this condition exists on the removed wire. Provide samples of this condition in addition to the original 3 samples required. Samples shall not contain gripper marks from the pulling device.
- 8.5.4.6.1 As a note of caution, be sure that the wire is moving freely before cutting. Otherwise there could be difficulty in removing the wire, requiring assist devices that could leave surface marks on the wire.
- 8.5.4.6.2 <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.



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

- 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

TM-N1043-500 Appendix D Revision 0, Page 83 of 180

			PSC PROCEDURE SQ10 TEST WIRE REMOVA Data Sheet 10 July 31, 200 Page 1 of Revision
Project: TMI 35 TH YEA	R TENDON SURVEILLANCE		⁷ 1
Tendon No.:	Tendon End:	Shop	Field
Removal Date:	Inspection Date:	<u></u>	
	WIRE REMOVAL IN	SPECTION	
CORROSION INSPECTION (8.5.4.1.1) Document the Corr	@ LENGTH INTERVALS rosion Category for each 10' of wire in the incr	ements below. Use Categories de	escribed in PSC SQ 8.0.
For Corrosion Level E docum			
(8.5.4.3.1) Document the tota	I length of the wire on the diagram below.	Completed:	
Button	head End		
**************************************		**************************************	**************************************
:xxxxxxxxxxxxxxxxxxxxxxxxx 30'	**************************************		***************************************
**************************************		80°	90'
:*************************************	**************************************	**************************************	**************************************
) ************************************		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	••••••••••••••••••••••••••••••••••••••
:*************************************	**************************************	**************************************	
			210'
:			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
	250'	260'	270'
270'	280'	290'	300'
		~~~~	
300'	310'	320' Cu	330'
8.5.4.6.2) Was the wire cut for	r samples: , 🔲 NO 🛛 🗍 YES document the a	area of removal above using symb	ol ×.
	f wire removed on Data Sheet 8.0, ANCHORA		
3.8) Measuring Device:	ID Number	Recal Da	ate:
8.8) Wire Pull Ram ID Numbe	ſ:		
Q.C nspector:	Level:	Date:	
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TM-N1043-500 Appendix D Revision 0, Page 84 of 180



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>Fuell Busso</u> Prepared by

1

Approved by

Approved-by

Title

PROJECT MANAGER, P.E.

Title

Q.A. MANAGER

07/31/09

Date

07/31/09

Date

PRESIDENT Title

07/31/09

Date



PSC PROCEDURE SQ 10.3 TESTING TENDON WIRES July 31, 2009 Page 2 of 6 Revision 0

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 (<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 10.3.

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.

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- 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 **<u>QCD</u>** 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 <u>QCD</u> 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 **QCD** 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 **QCD** Document the force and pressure at 1% elongation.
- 8.17 Remove the Dial Indicator.



PSC PROCEDURE SQ 10.3 TESTING TENDON WIRES July 31, 2009 Page 5 of 6 Revision 0

- 8.17.1 **QCD** 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 <u>QCD</u> Document the maximum elongation measurement from the "Rule" to accuracy of 0.05".
- 8.18.2 **QCD** Document the maximum force and pressure reading at failure.
- 8.19 Remove the sample wire (two pieces) and remove the Stressing Washers.
- 8.20 **QCD** 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) \div 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 **<u>QCD</u>** 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%.



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

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 <u>QCD</u> 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

TM-N1043-500 Appendix D Revision 0, Page 90 of 180

				TESTING TE	DURE SQ 10.3 NDON WIRES ata Sheet 10.3 July 31, 2009 Page 1 of 1 Revision 0
Project: TMI : Tendon No.:	35 TH YEAR TENDON S	URVEILLANCE			
	WIRE TEST DO	CUMENTATIO	N		
(8.5.2) Sample No.:					
Wire ID and Location of removal:		feet	Leng	ith:	in.
(8.6.1) Wire Diameters: Tag End	in. Middle	e in.	Ram End	in. Avg.	in.
- Measuring D	Jevice ID:		Recal Date:		
(8.9.1) Buttonhead Inspection:	Tag End		Ram End		
(8.10.1) Gauge Length of Wire:	in. Measuring D	Vevice ID:		Recal Date:	
(8.12.1) Preload force:	kips				
Preload pressure:	psi Pressure G	Bauge ID:		Recal Date:	
Ram ID:	Ram Area:	in ² K =	kips	Recal Date:	
)13.1) Force reduced to zero (0):					
(8.14.1) Initial load of wire force:	kips	(0.1% elonga	ition)		
Initial load of pressure:	psi	Elonga	ition:	in	
(8.15.1) Preset Dial Indicator:	(0.9% elongation	n) Indicator ID:		Recal Date:	
(8.16.1) Force at 1% elongation:	kips_	Pressure:		psi	
(8.17.1) "Rule" reading measurement at 19	% elongation:		in.		
(8.18.1) Maximum elongation at failure, fro	m "Rule" reading:		in.		
(8.18.2) Maximum force at failure:	kips	Press		psi	
(8.20) Type of break:		Location of br	eak:	in.	
CALCULATIONS:				<u>,</u>	
(8.21.1) Ultimate Stress:	ksi			kips) ÷ [π (dia ²) ÷ 4	
(8.21.2) Yield Stress @ 1% elongation:		si Stres	ss (ksi) = Force (k	tips) @ 1% ÷ [π (dia	$(in^2) \div 4$ (in ²)
(8.21.3) % elongation @ failure:	%			ilure – "Rule" Dimens	sion @ 1%)]
(8.21.4) Results: Acceptable	Unacceptable Custo	omer Notified NC	R No.:		
QC Inspector:		Level:		Date:	
)		<u></u>	a an		<u>na na n</u>
QC Reviewed:		Level:		Date:	

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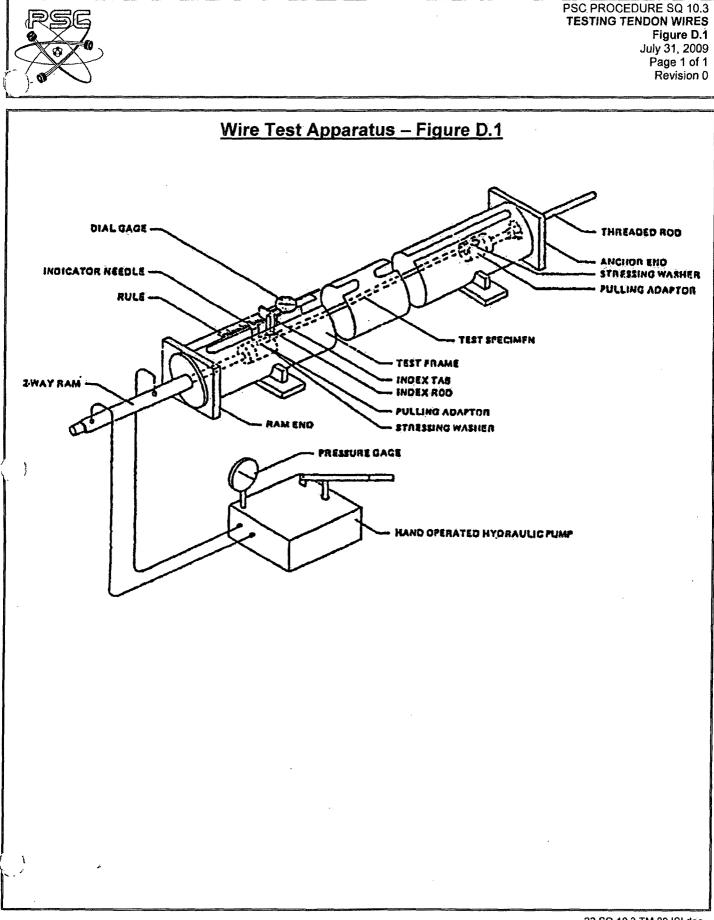
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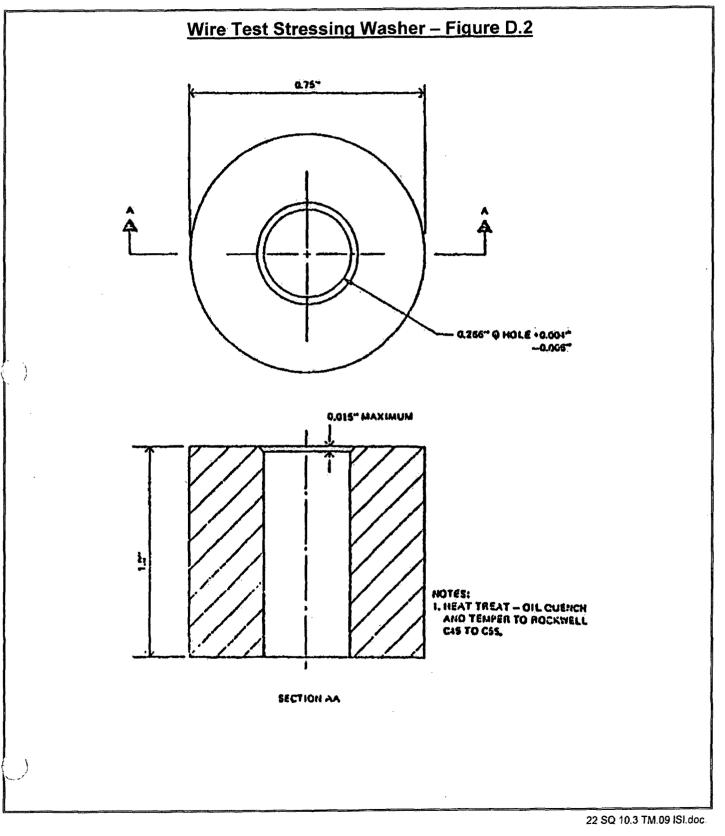
TM-N1043-500 Appendix D Revision 0, Page 91 of 180



TM-N1043-500 Appendix D Revision 0, Page 92 of 180



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



TM-N1043-500 Appendix D Revision 0, Page 93 of 180



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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 Buss Prepared by

proved 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



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PSC PROCEDURE SQ 10.5 CONTINUITY TEST July 31, 2009 Page 2 of 4 Revision 0

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.



PSC PROCEDURE SQ 10.5 CONTINUITY TEST July 31, 2009 Page 3 of 4 Revision 0

- 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.



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- 9.4 The wire shall be considered continuous if it can be observed to move at the opposite end of the tendon.
- 9.4.1 **QCD** Document that wire as continuous on Data Sheet 10.5.
- 9.5 If the wire cannot be observed to be moving, it could be broken and the pulling shall continue until that wire is removed.
- 9.5.1 <u>QCD</u> 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 **QCD** Document any comments identifying any nonconforming or adverse observations or conditions

10.0 DOCUMENTATION

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

11.0 ATTACHMENTS

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

TM-N1043-500 Appendix D Revision 0, Page 97 of 180

Rate	55 • ~ ~					CON	EDURE SQ 10.5 NTINUITY TEST Data Sheet 10.5 July 31, 2009 Page 1 of 1 Revision 0
Projec	ct: TMI 35 TH	YEAR T	ENDON	SURVEILL	ANCE	UNIT 1	a an
-	endon No.:				n End:	Shop 🔲 Field	d
		<u></u>		CONTINU	ITY TEST DOCUN	IENTATION	
(9.1.1) (9.3.3.2) Wire Force if greater than 9,425 lbs		Conti (9.4.1) Yes	nuous (9.5.1) No	(9.5.2) Corrosion Condition	(9.5.2.3) Broken & Posted to D.S. 8.0	(9.6) Comments	QC Signoff
)		00 -	ch with the		The Comments area Row Wires 1 7 2 8	each wire with a number corresponding to the r is to be used to identify any nonconforming cond This form can be used to 17 individual wires in fashion. If more than 17 verified or if the entire r verified, then a row by r inspection shall be perf	to verify up columnar 7 are to be ow is to be row
					$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Orient the anchorage s the Heat Code Identific note the wire number a in each row starting from side of each row.	ketch with ation and s it appears m the left Il be used to
					$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	the Heat Code Identific note the wire number a in each row starting from side of each row.	ketch with ation and s it appears m the left Il be used to
					$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	the Heat Code Identific note the wire number a in each row starting from side of each row. The comment area sha identify particular wires inspection remarks.	ketch with ation and s it appears m the left Il be used to

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PSC PROCEDURE SQ 10.5. CONTINUITY TEST Figure 1.0 July 31, 2009 Page 1 of 1 Revision 0

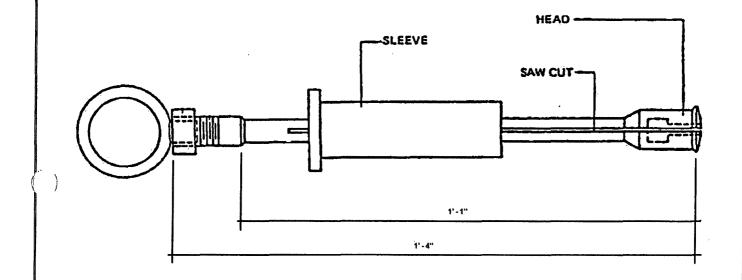
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Figure 1.0 – Tendon Wire Puller

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.



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TM-N1043-500 Appendix D Revision 0, Page 99 of 180





PSC PROCEDURE SQ 11.1 PSC ENGINEERING DATA 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

PSC ENGINEERING DATA

nall Busso Prepared by

Approved by

a

Approved b

QA MANAGER Title

Title

PRESIDENT

Title

07/31/09

Date

PROJECT MANAGER; P.E.

Date

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Date

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PSC PROCEDURE SQ 11.1 PSC ENGINEERING DATA July 31, 2009 Page 2 of 4 Revision 0

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.



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PSC PROCEDURE SQ 11.1 PSC ENGINEERING DATA July 31, 2009 Page 3 of 4 Revision 0

3.0 RETENSIONING DATA

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	PREVIOUSLY			AT RETENSIONING					Z	
TENDON	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 (In:)	
<u> Marine I ma</u>	<u>9 3 6 6 9 , 17 6)</u>	<u>i.a.tt.a.</u> e	<u>1 </u>	168	207	1555	3.32	6.69	1.3. 18.6 5 9.8	
H51-49	169	208.3	1564	167	206	1545	3.35	6.74	10.1	
				166	205	1536	3.38	6.79		
			• • •	168	207	1469	4:33	8.74		
V-90	169	208.3	1478	167	206	1460	4.37	8.80	12.35	
		<i>.</i> .		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		
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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.



PSC PROCEDURE SQ 11.1 PSC ENGINEERING DATA July 31, 2009 Page 4 of 4 Revision 0

- 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 (in²) P = Gauge Pressure (psi) K = Constant factor (kips) (<u>CAUTION</u>: "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.

TM-N1043-500 Appendix D Revision 0, Page 103 of 180



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 Prepared by Date PROJECT MANAGER, P.E. 07/31/09 Title Date Approved by PRESIDENT 07/31/09 Title Approved by Date 25 SQ 12.0 TM.09 ISI.doc



PSC PROCEDURE SQ 12.0 REPLACE GREASE CAP July 31, 2009 Page 2 of 5 Revision 0

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

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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.



PSC PROCEDURE SQ 12.0 REPLACE GREASE CAP July 31, 2009 Page 3 of 5 Revision 0

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- 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.



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

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.

Project:	TMI 35 TH YEAR TENDON SURVEILLANCE			
Tendon No.:	Tendon End:	Shop	🗌 Field	
	ANCHORAGE INSPECTION CR	ITERIA		
	BEARING PLATE SURFACE PROPERLY PREPARED:			
	GREASE CAP SURFACE PROPERLY PREPARED:			
	GASKET MATING SURFACE PROPERLY PREPARED:	T YES		
	STUD/BOLT HOLES PROPERLY PREPARED	T YES		
I	FOREIGN MATERIAL EXCLUSION CONTROLLED:	TYES		
CREW F=of	REMAN SIGNOFF		Date:	
" QC Review	wed: Lev	əl:	Date:	. <u>.</u>

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PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 1 of 10 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 REPLACEMENT

u all Buss Prepared by

QA MANAGER Title

PROJECT MANAGER, P.E.

Title

07/31/09

Date

07/31/09

Date

Approved by

Approved

PRESIDENT

07/31/09 Date

26 SQ 12.1 TM.09 ISI.doc



PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 2 of 10 Revision 0

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.



PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 3 of 10 Revision 0

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 <u>QCD</u> 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.



PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 4 of 10 Revision 0

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- 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.



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- 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.

26 SQ 12.1 TM.09 ISI.doc



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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 **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.
- 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.



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- 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 **QCD** Document the quantities of waste grease if any, including any exiting outflow grease. Refer to Section 11.0 of this procedure for explanation on calculating waste grease.
- 12.19 **<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.



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PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 8 of 10 Revision 0

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 **QCD** Document the inlet temperature of the grease as well as the thermometer identification and its recalibration date.
- 13.8 Prior to attaching the inlet greasing hose to the Y-Device or grease cap, circulate hot grease through the system to ensure the grease is at sufficient temperature prior to pumping into the tendon void. Hand pump and greasing hose should be fully primed prior to connecting to the Y-Device. This step is not necessary if grease is being poured into the grease cap.
- 13.9 <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.
- 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.



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PSC PROCEDURE SQ 12.1 GREASE REPLACEMENT July 31, 2009 Page 9 of 10 Revision 0

- 13.13 Remove grease hoses and Y-Devices as necessary from both ends and replace the grease cap plugs on both ends of the tendon. Verify no grease is leaking.
- 13.14 **QCD** Calculate and document the quantity of hot grease hand pumped or poured into this tendon end in accordance with Section 10.6. Also, document the tendon end identification, either shop/field and/or nearest buttress number to the tendon end being pumped.
- 13.15 **QCD** Document whether grease replacement was accomplished by hand pumping or pouring.
- 13.16 **QCD** Document the quantities of waste grease if any. Refer to Section 11.0 of this procedure for explanation on calculating waste grease.
- 13.17 **<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 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 <u>QCD</u> 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 <u>QCD</u> 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 <u>QCD</u> 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.



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

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

15.0 NOTIFICATION

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

16.0 DOCUMENTATION

- 16.1 The items requiring documentation shall be documented on Data Sheet 12.1a or 12.1b as necessary. Data Sheet 12.1a shall be used when a tendon is pressure pumped and 12.1b shall be used when a tendon is hand pumped from both ends.
- 16.2 Some information shall be posted from Data Sheet 6.0 of PSC Procedure SQ 6.0 onto Data Sheet 12.1a or 12.1b as applicable.
- 16.3 The Data Sheets reference the applicable Section or Step number of the procedure for each <u>QCD</u> point.

17.0 ATTACHMENTS

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

TYPICAL HOOK-UP FOR FILLING TENDON VOIDS

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F

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B

G

(D)

C

A

(H) Being threaded into position

- 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

Figure

1.0 -

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"Y-Device"

TM-N1043-500 Appendix D Revision 0, Page 119 of 180



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

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Project: TMI 35 th YEAR TENDON SURVEILLANCE		Tendon No.:	
GREASE RE	PLACEMENT		QC SIGNOFFS
(8.4) Grease Used INEW OLD - TEST DATE: 8.0 PREREQUISITES		APPROVAL LETTER DATED:	1 1 1 5
(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.	t 1 1
(8.8) Estimated grease losses from leaks for	tendon end:	gal.	1 6 8 9
(8.9) TOTAL Tendon Grease Loss:		gal.	1 1 1 1
12.0 INITIAL PRESSURE PUMPING			L
(12.6) Ambient Temp.: <u>°F</u> Thermometer ID:	Recal Date:		
(12.7) Grease Temp.: <u>°F</u> Thermometer ID:	Recal Date:		
(12.9) <u>Initial</u> Grease Height (a) in.	(12.14) Final Grease Height (b)	in.	
(12.16) Total amount of Grease Pumped:	gal. (a – b) × 1.77 into the	end	
2.18) Quantity of Waste Grease:	gal. (12.17) Was Exit Achieved	i? 🗌 Yes 🗌 No	
(12.19) Total Grease <u>Replaced</u> this end:	gal. If no, Pressure Held for	psi min	
13.0 HAND PUMPING - SECOND END (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) Initial Grease Height (a) in.	(13.12) Final Grease Height (b)	in	
(13.14) Total amount of Grease added:	gal. (a - b) × 1.77 into the	end	
(13.16) Quantity of Waste Grease:	gal. (13.15) 🗍 Poured 🗍	Hand Pumped	
(13.17) Total Grease <u>Replaced</u> this end:	gal.		
14.0 CALCULATION OF PRESSURE PUMPING			
(14.1) Total Tendon Grease Replaced:	gal. (12.19 + 13.17)		
(14.2) Net Tendon Duct Grease Volume:	gai. Refer to SQ 12.2 - GREASE VOLUMES, for	the Tendon Net Duct Volume	
(14.3) Percent Difference: Total Tendon Replaced (14.1) Net Tendon Duct Gree	x 100 ⊭	% Difference	
(14.4) Grease Leaks: 🗌 Yes)		
(14.5) Refill Acceptable: 🗍 Yes (less than 10%)	(greater than 10%)		
	tomer Notified NCR No.:		
(14.6) Comments:	- <u></u>		
<u>)</u>		· · · · · · · · · · · · · · · · · · ·	
QC Reviewed:	Level:	Date:	

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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.:	
GREASE REPLAC	CEMENT QC SIGNO	FFS
(8.4) Grease Used INEW IOLD - 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.	
13.0 POURING AND HAND PUMPING - FIRST END		
(13.6) Ambient Temp.: ºF Thermometer ID:	Recal Date:	
(13.7) Grease Temp.: °F Thermometer ID:	Recal Date:	
(13.9) <u>Initial</u> Grease Height (a) in. (13.1	2) <u>Final</u> Grease Height (b) in.	
(13.14) Total amount of Grease added: gal.	(a – b) x 1.77 into the end	
3.16) Quantity of Waste Grease: gal.	(13.15)	
(13.17) Total Grease <u>Replaced</u> this end: gal.		-
13.0 HAND PUMPING - SECOND END		
(13.6) Ambient Temp.: °F_ Thermometer ID:	Recal Date:	
(13.7) Grease Temp.: <u>°F</u> Thermometer ID:	Recal Date:	
(13.9) <u>Initial</u> Grease Height (a) in. (13.1	2) <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 <u>Replaced</u> this end: gal.		
14.0 CALCULATION OF PRESSURE PUMPING		
(14.1) Total <u>Tendon</u> Grease Replaced: gal.	_ (13.17 + 13.17)	
(14.2) Net Tendon Duct Grease Volume: gal.	<u></u>	
(14.3) Percent Difference: Total Tendon Replaced (14.1) - Total Net Tendon Duct Grease Vol		
(14.4) Grease Leaks: Yes No		<u>. </u>
(14.5) Refill Acceptable: Yes (less than 10%) No (greate	er than 10%)	
If No – Customer (14.6) Comments:	Notified NCR No.:	
Reviewed:	Level: Date:	

26 SQ 12.1 TM.09 ISI.doc

TM-N1043-500 Appendix D Revision 0, Page 122 of 180



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

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UNIT 1 (3	EXELON EE MILE ISLAND 5 TH YEAR) PHYSICAL DING TENDON SURVEILLAN	CE							
IN-SER	PRECISION SURVEILLANCE CORPORATION IN-SERVICE INSPECTION QUALITY CONTROL PROCEDURE								
GRE	GREASE VOLUMES								
Gerald Bussane	QA MANAGER	07/31/09							
Prepared by	Title	Date							
Chithel	PROJECT MANAGER, P.E.	07/31/09							
Approved by	Title	Date							
Approved by	PRESIDENT	07/31/09 Date							
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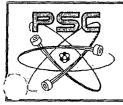
PSC PROCEDURE SQ 12.2 GREASE VOLUMES July 31, 2009 Page 2 of 3 Revision 0

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.



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PSC PROCEDURE SQ 12.2 GREASE VOLUMES July 31, 2009 Page 3 of 3 Revision 0 ÷

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		Table 2-1	8 TMI - SQ 124	18 CITATE	Vold Volum	ics - Unit I		
TENDON	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	1,19.9	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			
			- - 	• 	· · · · ·			

27 SQ12.2.BY.09 ISI.doc



PSC PROCEDURE QA 1.0 PROGRAM 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 **PROGRAM PURPOSE** Q.A. MANAGER Zu all Busso Prepared by 07/31/09 Title Date PROJECT MANAGER, P.E. 07/31/09 Title Date Approved by PRESIDENT 07/31/09 Title Approved Date 31 QA 1.0 TM.09 ISI.doc



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

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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.



PSC PROCEDURE QA 2.0 PROGRAM SCOPE 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

PROGRAM SCOPE

<u>Juall Busso</u> Prepared by

Approved by

toproved by

PRESIDENT Title

Q.A. MANAGER

Title

PROJECT MANAGER, P.E.

Title

07/31/09

07/31/09

Date

07/31/09

Date

Date

32 QA 2.0 TM.09 ISI.doc



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PSC PROCEDURE QA 2.0 PROGRAM SCOPE July 31, 2009 Page 2 of 2 Revision 0

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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. TM-N1043-500 Appendix D Revision 0, Page 129 of 180



PSC PROCEDURE QA 3.0 QUALITY ORGANIZATION 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 QUALITY ORGANIZATION Q.A. MANAGER 07/31/09 Prepared by Title Date PROJECT MANAGER, P.E. 07/31/09 Title Approved by Date PRESIDENT 07/31/09 Title Date 33 QA 3.0 TM 09 ISI.doc



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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.



PSC PROCEDURE QA 4.0 RESPONSIBILITY 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

QUALITY CONTROL RESPONSIBILITY

Q.A. MANAGER

Title

Prepared by

Approved by

Approved by

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

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07/31/09

Date



PSC PROCEDURE QA 4.0 RESPONSIBILITY July 31, 2009 Page 2 of 2 Revision 0

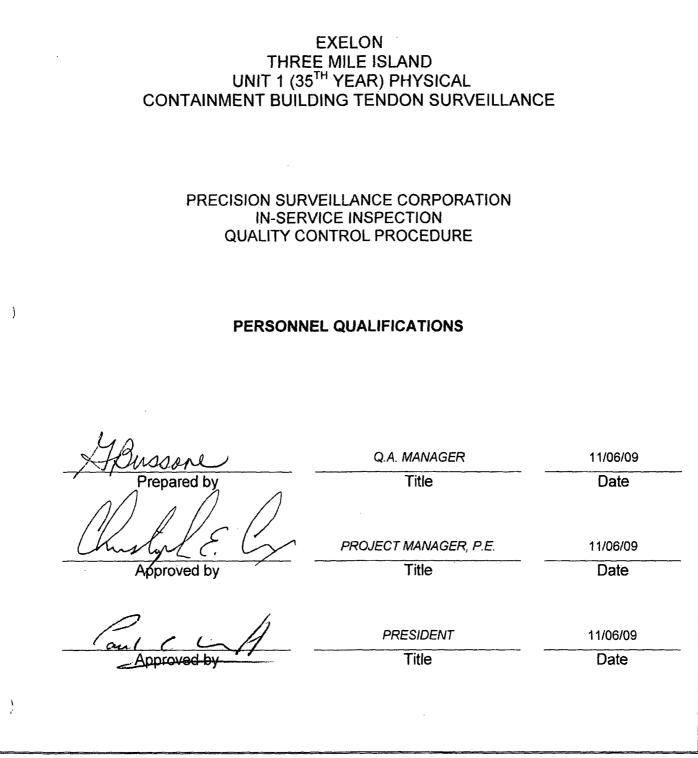
1.0 QUALITY CONTROL RESPONSIBILITY

- 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.

TM-N1043-500 Appendix D Revision 0, Page 133 of 180



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



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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

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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 Fast 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:

TRAINING VERIFICATION

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.

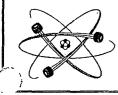
Personnel successfully trained to the above requirements have the knowledge, insight and training to inspect post-tensioning components as described in Precision Surveillance Corporation's limited scope training procedure. This training is relevant to IWL inspections for 1992 Edition and latter Editions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

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Paul C. Smith President

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TM-N1043-500 Appendix D Revision 0, Page 137 of 180





PSC PROCEDURE QA 5.0 PERSONNEL TRAINING July 31, 2009 Page 1 of 2 Revision 0

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<u>Frepared by</u>	Q.A. MANAGER	07/31/09 Date
Approved by	PROJECT MANAGER, P.E.	07/31/09 Date
Approved by	Title	07/31/09 Date
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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.

TM-N1043-500 Appendix D Revision 0, Page 139 of 180



PSC PROCEDURE QA 6.0 PROCUREMENT 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

PROCUREMENT

Prepared by

Churth E.C.

Approved by

Approved by

Q.A. MANAGER

Title

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

Date

07/31/09

Date

PRESIDENT Title

07/31/09 Date



PSC PROCEDURE QA 6.0 PROCUREMENT July 31, 2009 Page 2 of 2 Revision 0

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.

TM-N1043-500 Appendix D Revision 0, Page 141 of 180

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164 - 144



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

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; FIELD	CHANGE REQUEST	
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Chitle. La	PROJECT MANAGER, P.E. Title	07/31/09 Date
Appfoved by		
Approved by	PRESIDENT	07/31/09 Date



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PSC PROCEDURE QA 7.0 FIELD CHANGE REQUEST July 31, 2009 Page 2 of 3 Revision 0

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.



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

- 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
- 1.3.7.2.1 FCR Number
- 1.3.7.2.2 Brief Description
- 1.3.7.2.3 Date Written
- 1.3.7.2.4 Date Approved
- 1.3.7.2.5 Date of Revision (to Surveillance 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

38 QA 7.0 TM.09 ISI.doc

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					PROCEDURE QA 7.0 GE REQUEST FORM July 31, 2009 Page 1 of 1 Revision 0
SPECIAL FIELD REVISION	CONTROL	FIELD CHANGE	REQUEST NO.: FCR		·····
REQUEST BY:	A STATE OF A	TITLE:	DA	NTE:	
			DA	ATE:	
PROCEDURE NUMBER:		REV NO.:	PROCEDURE TITLE		
AFFECTED SECTION:			REVISION TO MANU	JAL REQUIRED:	YES NO
NCR REQUIRED:	YES NO	NCR NUMBER:		HOLD TAG NO .:	······································
RECOMMENDED CHANGE	:				
PSC APPROVAL SIGN & DATE:	QÁ	QC		ENGINEERING	
EXELON APPROVAL OR C	OMMENTS:	,			
APPROVED SITE QA AUTH	ORITY:	TITLE	:	DATE	
DISPOSITION PSC QC: QC INSPECTOR:		DLD TAG PLIED:	HOLD TA REMOVE DATE:		
		DN ENGINEERING ECT MGR. PSC DN QC	QC PSC		

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38 QA 7.0 TM.09 ISI.doc

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TM-N1043-500 Appendix D Revision 0, Page 145 of 180



PSC PROCEDURE QA 7.0 FIELD CHANGE REQUEST INDEX LOG July 31, 2009 Page ____ of ___ Revision 0

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TM-N1043-500 Appendix D Revision 0, Page 146 of 180



PSC PROCEDURE QA 8.0 DOCUMENT CONTROL 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

DOCUMENT CONTROL

In all Bussone Prepared by

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Title

PROJECT MANAGER, P.E.

Title

Q.A. MANAGER

07/31/09 Date

07/31/09

Date

07/31/09

PRESIDENT Title

Date



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PSC PROCEDURE QA 8.0 DOCUMENT CONTROL July 31, 2009 Page 2 of 2 Revision 0

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.

TM-N1043-500 Appendix D Revision 0, Page 148 of 180



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

Tural Bussone Prepared by

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Approved by

Approved by

Q.A. MANAGER Title 07/31/09

Date

PROJECT MANAGER, P.E.

Title

PRESIDENT

Title

07/31/09 Date

07/31/09

Date



PSC PROCEDURE QA 8.1 REVISION CONTROL July 31, 2009 Page 2 of 5 Revision 0

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.



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PSC PROCEDURE QA 8.1 REVISION CONTROL July 31, 2009 Page 4 of 5 Revision 0

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.



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

- 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

TM-N1043-500 Appendix D Revision 0, Page 153 of 180



PSC PROCEDURE QA 8.1 REVISION CONTROL SHEET

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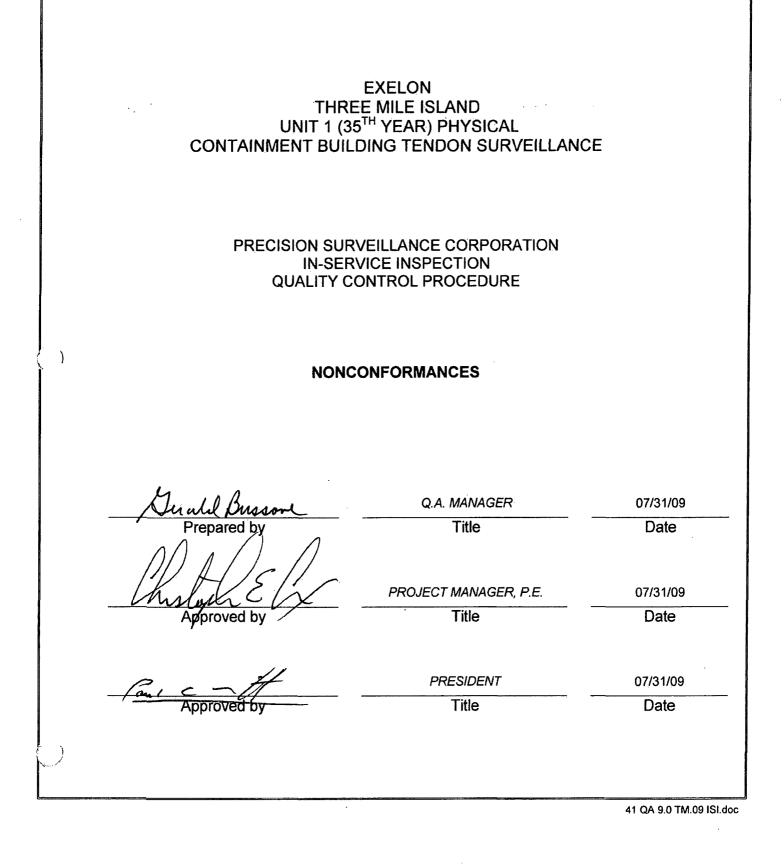
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TM-N1043-500 Appendix D Revision 0, Page 154 of 180



PSC PROCEDURE QA 9.0 NONCONFORMANCES July 31, 2009 Page 1 of 5 Revision 0





PSC PROCEDURE QA 9.0 NONCONFORMANCES July 31, 2009 Page 2 of 5 Revision 0

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.



- 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.



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- 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

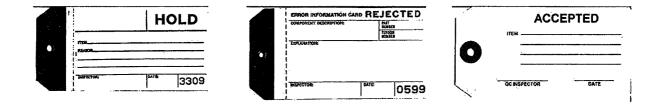
- 6.1 Tags and Sample Logs (Example)
- 6.2 Sample NC/CA Report
- 6.3 NC/CAR Form
- 6.4 NCR Index Form
- 6.5 Hold Tag Index Log
- 6.6 Reject Tag Index Log



NONCONFORMING MATERIALS, PARTS OR COMPONENTS

TAGS

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



SAMPLE LOG ENTRIES

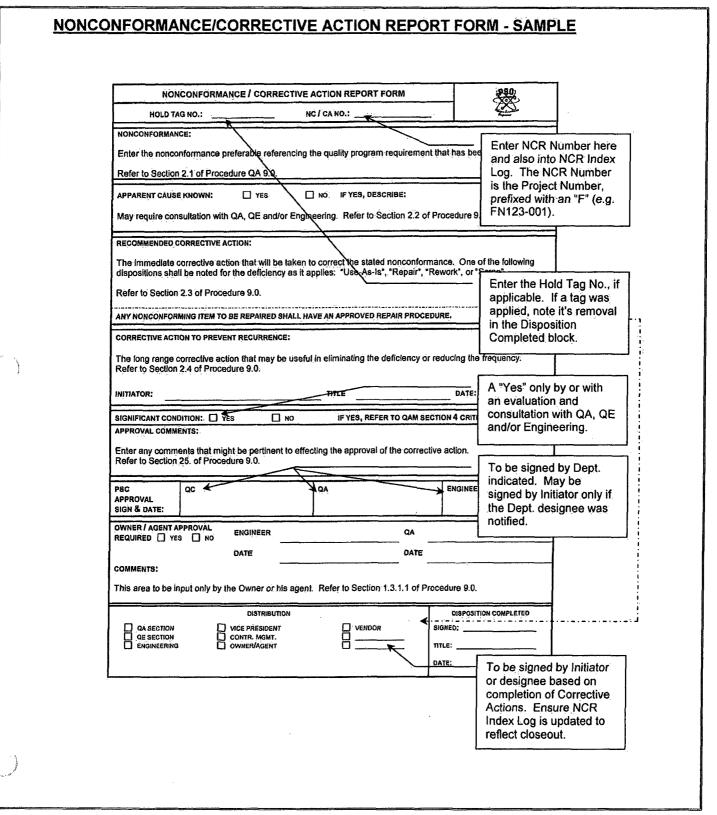
Shown below are typical examples of entries made into each respective log. Note that some are cross-referenced such as HOLD 1100 to Reject 1700; and HOLD 1103 to Reject 1701.

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Project:					
Tag No.	Date Issued	Description of Condition	Date Removed	OC Signoif	
1100	5.1.05	Arenaz (CE101 Dama450	5-2-05	CB	
1101	5-6-05	Documentranon Incomplete CT1036	5-8-05	DMW	
1102	6-4-05	TENDON ACIOI - FUELD END CUTOFF	610.05	ез	
1103	6-15-05	RUSTY TENDON VIBS	6-16-05	JWK	
1104	7-2-05	Churche TO COURCE TO TENDON VILLI			
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6-21-05	DRUMOF GREASE CONTAMULATED	SURAT	622-05	СВ
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7-2-05	Shows Damageo - HT #43691-	SCRAP	1-205	ĊB
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TM-N1043-500 Appendix D Revision 0, Page 160 of 180





TM-N1043-500 Appendix D Revision 0, Page 161 of 180

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HOLD TAG NO.:			- NC /	CA NO.:	
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ANY NONCONFORMING	ITEM TO BE REPAIRED	SHALL HAVE	AN APPROVED	REPAIR PROCED	URE.
ORRECTIVE ACTION T	O PREVENT RECURREN	ICE:			
			TITLE		DATE:
SIGNIFICANT COND			IF YES, R	EFER TO QAM SE	CTION 4 CRITERIA XV.
APPROVAL COMMENTS	3:				
PSC APPROVAL SIGN & DATE:	QC		QA		ENGINEERING
EXELON APPROVAL REQUIRED		ER		DATE	
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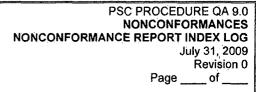
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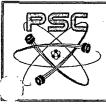
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PSC PROCEDURE QA 9.0 NONCONFORMANCES HOLD TAG INDEX LOG July 31, 2009 **Revision 0** Page ____ of ___

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PSC PROCEDURE QA 9.0 NONCONFORMANCES REJECT TAG INDEX LOG July 31, 2009 Revision 0 Page ____ of ____

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TM-N1043-500 Appendix D Revision 0, Page 165 of 180



**PSC PROCEDURE QA 10.0** CALIBRATION 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

#### **CALIBRATION OF MEASURING** AND TEST EQUIPMENT

Unall Busson Prepared by

Approved by

PROJECT MANAGER, P.E. Title

Approved

PRESIDENT Title

Q.A. MANAGER

Title

07/31/09 Date

07/31/09

Date

07/31/09

Date



PSC PROCEDURE QA 10.0 CALIBRATION July 31, 2009 Page 2 of 5 Revision 0

#### 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.



PSC PROCEDURE QA 10.0 CALIBRATION July 31, 2009 Page 3 of 5 Revision 0

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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.
- 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.



PSC PROCEDURE QA 10.0 CALIBRATION July 31, 2009 Page 4 of 5 Revision 0

- 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.



PSC PROCEDURE QA 10.0 CALIBRATION July 31, 2009 Page 5 of 5 Revision 0

# 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	<u>+</u> 0.10% <u>+</u> 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	+ 0.0100" + 1/16"/100' of lgth.
Thermometer	1 Year	± 1 DISS
Optical Comparator	1 Year	<u>+ 0.0010"</u>
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.

42 QA 10.0 TM.09 ISI.doc

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TM-N1043-500 Appendix D Revision 0, Page 170 of 180



PSC PROCEDURE QA 10.1 CALIBRATION VERIFICATION 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

# VERIFICATION OF CALIBRATION STATUS OF HYDRAULIC PRESSURE GAUGES

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Approved by

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Title

Q.A. MANAGER

07/31/09 Date

PROJECT MANAGER, P.E.

07/31/09

Date

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Date

43 QA 10.1 TM.09 ISI.doc



PSC PROCEDURE QA 10.1 CALIBRATION VERIFICATION July 31, 2009 Page 2 of 5 Revision 0

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# 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.

43 QA 10.1 TM.09 ISI.doc



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PSC PROCEDURE QA 10.1 CALIBRATION VERIFICATION July 31, 2009 Page 4 of 5 Revision 0

- 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.



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

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# 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.

14

TM-N1043-500 Appendix D Revision 0, Page 175 of 180

PSC PROCEDURE QA 10.1 GAUGE CALIBRATION RECORD FORM July 31, 2009 Page of Revision 0				
Project: TMI NUCLEAR PLANT UNIT 1 – 35 th Year	Job #N1043			
GAUGE CALIBRATI	ON VERIFICATION RECORD			
DATE CHECKED. GAUGE I.D. MASTER GAUGE I.D. REMARKS	MASTER GAUGE (PSI) JACK GAUGE (PSI)			
QC SIGN OFF				
) Project: TMI NUCLEAR PLANT UNIT 1 – 35 th Year Job # <u>N1043</u>				
GAUGE CALIBRATI	ON VERIFICATION RECORD			
DATE CHECKED GAUGE I.D MASTER GAUGE I.D REMARKS	MASTER GAUGE (PSI) JACK GAUGE (PSI)			
QC SIGN OFF				
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TM-N1043-500 Appendix D Revision 0, Page 176 of 180



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

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PROJECT MANAGER, P.E.

Title

07/31/09

Date

07/31/09 Date

Approved by

Approved by

PRESIDENT Title 07/31/09 Date

44 QA 11.0 TM.09 ISI.doc



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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.

TM-N1043-500 Appendix D Revision 0, Page 179 of 180



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Precision Surveillance Corporation

PSC PROCEDURE QA 12.0 AUDITS 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

# AUDITS

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Date

07/31/09

Date

45 QA 12.0 TM.09 ISI.doc

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PSC PROCEDURE QA 12.0 AUDITS July 31, 2009 Page 2 of 2 Revision 0

## 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.

TM-N1043-500 Appendix E Revision 0, Page 1 of 124

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•					ce Procedur	e		1-9.1
)	Title						Revision No.	
_	<b>RB</b> Struct	ural Integrity	Tendon S	Surveillance			1	0
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				List of Effect	ive Pages			
	Page	<u>Revision</u>	Page	Revision	Page	<u>Revision</u>	Page	<u>Revision</u>
	1	20	41	20	81	20		
	2 3	20 20	42 43	20 20				
		20	43 44	20				
	5	20	45	20				
	6	20	46	20				
	7 8	20 20	47 48	20 20				
	9	20	49	20				
	10	20	50	20				
	11	20	51	20				
	12 13	20 20	52 53	20 20				
	14	20	54	20				
)	15	20	55	20				
,	16 17	20 20	56 57	20 20				
	18	20	58	20				
	19	20	59	20				
	20	20	60	20				
	21 22	20 20	61 62	20 20				
	23	20	63	20				
	24	20	64	20		,		
	25 26	20 20	65 66	20 20				
	27	20	67	20				
	28	20	68	20				
	29	20	69	20				
	30 31	20 20	70 71	20 20				
	32	20	72	20				
	33	20	73	20				
	34 25	20	74 75	20 ·				
	35 36	20 20	75 76	20 20				
	37	20	77	20				
	38	20	78	20				
	39 40	20 20	79 80	20 20				
	40	20	ov	20				

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# TM-N1043-500 Appendix E Revision 0, Page 2 of 124

			Number
v		TMI - Unit 1 Surveillance Procedure	1301-9.1
Title			Revision No:
RB S	Structural Integrity Tende	on Surveillance	20
		TABLE OF CONTENTS	
Sectio	<u>n</u>		Page
1.0	PURPOSE		4
2.0	REFERENCES		4
3.0	PLANT STATUS		. 6
4.0	PREREQUISITES		7
5.0	LIMITS AND PRECAUTION	S	9
6.0	DESCRIPTION AND LOCAT	ION OF SYSTEM/ASSEMBLY	9
7.0	SPECIAL TOOLS, MATERIA	ALS AND PERSONNEL QUALIFICATIONS	10,
8.0	PROCEDURE		13
9.0	ACCEPTANCE CRITERIA		23
10.0	REPORTS		25
⁾ FIGUI	RES		
1.	Tendon Detail - Typical Hoop	/Dome	27
DATA	SHEETS		
1.	Lift Off Force Measurement		28
2.	As Found Lift Off Force Sum	mary Results	29
3.	Deleted		30
4.	Elongation/Tendon Force Re	cord	.31
5.	Average of the Normalized Li	ft-off Force	35
6.	Retensioning Criteria Confirm	ation	36
7.	Deleted		37
8.	Diameter Check on Anchorag	e and Ram Adaptor (Optional)	.38
9.	Tendon Anchorage Area Mois	sture/Free Water Inspection	39

()

## TM-N1043-500 Appendix E Revision 0, Page 3 of 124

Title RB S	Structural Integrity Tend	TMI - Unit 1 Surveillance Procedure	Number <b>1301-9.1</b> Revision No. <b>20</b>
-		TABLE OF CONTENTS (Cont'd)	
Sectio	n		Page
DATA	SHEETS (Cont'd)		
10.	Deleted		40
11.	Tendon Surveillance Progra	ım	41
12.	VT-1C / VT-3C Examiner Q	ualification	42
13.	Review/Acceptance of Cont	ractor Procedures	43
ENCL	OSURES		
1.	Stressing Ram Calibration		44
2.	Scope of Each Scheduled S	Surveillance	46
3.	Collection/Lab Analysis of F	iller Grease	51
4.	Tendon Wire Removal/Phys	ical Testing	57
5.	(Deleted)		62
6.	Anchorage Inspections		63
7.	Additional Inspection Comm	itments Due to Previous Abnormalities	79
8.	Safe Access Guidelines for	Tendon Work During Power Operation	81

1

( )

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#### TM-N1043-500 Appendix E Revision 0, Page 4 of 124

		Number
Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revisión No.
RB Structural Integrity Tendon Surveillance		20

## 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 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. Unless surveillance results indicate abnormal degradation of the prestressing system, 11 tendons shall be inspected for each subsequent surveillance period. Prior to Cycle 7, and for subsequent periods, an additional vertical tendon was selected in order to comply with Table IWL-2521-1. Total is twelve (12). Enclosure 2, Tables 1 and 2, provides identification of tendons for each inspection period per GAI DC-5930-225.02-SE. Tendon selection is random and meet the requirement 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 2525. Substitute tendons shall be selected per IWL-2521.1(b).

1.3 A special one-time event-related tendon surveillance is performed within one year (plus/minus 3 months per ASME Code Section XI, 2001 Edition through 2003 Addenda 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. This special surveillance satisfies an NRC recommendation from the NRC SER of Tech. Spec. Amendment #259 approving deferral of the ILRT Performance until 2009.

## 2.0 **REFERENCES**

- 2.1 TMI Unit 1 Technical Specifications Section 4.4.2, "Structural Integrity"
- 2.2 TMI Industrial Safety and Health Manual
- 2.3 NO-AA-10, Quality Assurance Topical Report
- 2.4 RP-AA-403, Administration of the Radiation Work Permit Program.
- 2.5 1001J.1, Surveillance Testing Program

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## TM-N1043-500 Appendix E Revision 0, Page 5 of 124

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	ructu 2.6 2.7		TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No. 20
RB Str	2.6			
	2.6			20
		OP-AA-201-009	<b></b>	
	2.7		Control of Transient Combustible Material	
		MA-AA-716-100	Maintenance Alterations Process	
	2.8	MA-AA-716-025	Scaffold Installation Modification and Removal Re	equest Process
	2.9	Inryco, Reactor I	Building Tendons, VM-TM-2485	
	2.10	IEN 85-10 and S Failure; date Fel	upplement 1 to same, entitled Post Tensioned Cor ruary 6, 1985	ntainment Tendon Anchörhead
:	2.11	SP-1101-23-007	, Latest Revision, RB Tendon Surveillance Specific	cation
:	2.12	TMI-1 Operating (supplied by ven	manuals and calibration charts for hydraulic stress dor).	sing jack, pumps, and controls
:	2,13	Building Pre-Stre Stressing Record	essing System Tendon History, including Tendon P ds (cards).	ulling, Buttonheading, and
:	2.14	Reports from pre	vious surveillance	
		<b>0</b> 1974 S	Structural Integrity Test - GAI Report 1838	
		<b>2</b> 1975 1	endon Surveillance - 1301-9.1 - GAI Report 1880	
		1977     1	endon Surveillance - 1301-9.1 - Report GQL 0204	ł
		<b>o</b> 1980 1	endon Surveillance - 1301-9.1 - TDR 229	
		<b>9</b> 1985 1	endon Surveillance - 1301-9.1 - Topical Report 02	25
		<b>@</b> 1990 T	endon Surveillance - 1301-9.1 - Topical Report 06	i9
		<b>o</b> 1995 T	endon Surveillance - 1301-9.1 & Topical Report 0	93
		<b>©</b> 1999 T	endon Surveillance - 1301-9.1 and Topical Report	: 136
		<b>9</b> 2004 T	endon Surveillance – 1301-9.1 and Topical Repor	t 183
		@ 1977 F	B Ring Girder Surveillance Three Years After S.I.T	Г 1303-8.2
:	2.15	1410-Y-83, RB T	endon End Cap Installation	
:	2.16	1440-Y-23, RB C	oncrete Surface Crack Repairs	
:	2.17		5.01-SE and GAI DC-5390-225.02-SE, TMI-1 Read Selection and Force vs. Time Curves Surveillances	
2	2.18	Regulatory Guide Containments.	1.35, Rev. 3, Inservice Inspection of Ungrouted T	endons in Prestressed Concre

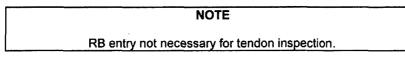
#### TM-N1043-500 Appendix E Revision 0, Page 6 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title		Revision No.
RB Structural Integrity Tendon Surveillance		20

- 2.19 G/C Calculation 1:01:01.01, "Structural Design Review Book 1" (Source Document)
- 2.20 MA-AA-716-021, Rigging and Lifting Program
- 2.21 AD-AA-2001, Management and Oversight of Supplemental Workforce
- 2.22 10CFR 50.55a, Codes and Standards
- 2.23 EN-MA-501, Controlled Materials and Hazard Communication Program
- 2.24 ASME XI 1992 Edition through 1992 Addenda, Subsection IWL
- 2.25 ACI 201.1R-92, "Guide for Making a Condition Survey of Concrete In Service"
- 2.26 ACI 349.3R-96, "Evaluation of Existing Nuclear Safety Related Concrete Structures"
- 2.27 TMI-1 C-1101-153-E410-031, 032, and 033, Tendon Grease Void Calculations for Vertical, Horizontal, and Dome Tendons, respectively
- 2.28 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
- 2.29 Reactor Building Drawings TMI 1-0014/0015/0016, IWE Component Rollout-Outside Containment Concrete
- 2.30 ER-AA-330-006, Inservice Inspection and Testing of the Pre-stressed Concrete Containment Post Tensioning System
- 2.31 <u>Commitments</u>
  - CM-1 Action Tracking Item AR 603573.25.06, License Renewal Aging Management ASME Section XI, Subsection IWL. (Step 1.1)
  - **CM-2** Action Tracking Item AR 603573.38.04, License Renewal Aging Management Concrete Containment Tendon Prestress. (Step 1.1)

## 3.0 PLANT STATUS

3.1 Operating or Shutdown.



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

#### TM-N1043-500 Appendix E Revision 0, Page 7 of 124

		Number
C	TMI - Unit 1 Surveillance Procedure	1301-9.1
) Title		Revision No.
RB Structural Integrity Tendon Surveillance		20

## 4.0 **PREREQUISITES**

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- 4.1 TENDON SURVEILLANCE CONTRACTOR (CONTRACTOR) shall perform tendon surveillance in accordance with this procedure, per Reference 2.3 and 2.11.
  - 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:
  - Inspection of removed wires for corrosion and other defects, and to perform required tensile tests. (See Enclosure 4.)
  - Inspection of bulk filler grease samples and test for chlorides, sulfides, nitrates, base number and moisture content. (See Enclosure 3.)
  - Calibration (traceable to NIST) of all hydraulic rams and gauges to be used.

## NOTE

- 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.
- 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)).
- 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.
  - 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.

#### TM-N1043-500 Appendix E Revision 0, Page 8 of 124

			Number
· .		TMI - Unit 1 Surveillance Procedure	1301-9.1
( )	Title		Révisión No.
	<b>RB Structural Integrity Tend</b>	on Surveillance	20

- 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 tälkies) 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.

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- 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. 2.24), 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.
- 4.17 COGNIZANT WORK COORDINATOR verify that the experience and training of Contractor personnel performing VT-1C / VT-3C examinations satisfy the requirements established by the Responsible Engineer. Verify that these individuals are identified on Data Sheet 12 and that the Responsible Engineer has signed that data sheet to attest acceptance of these individuals as VT-1C VT-3C examiners.
- 4.18 Document review and acceptance of applicable contractor procedures on Data Sheet 13.

#### TM-N1043-500 Appendix E Revision 0, Page 9 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title		Revision No.
RB Structural Integr	ity Tendon Surveillance	20

## 5.0 LIMITS AND PRECAUTIONS

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- 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 done in accordance with TMI-1 Safety and Health Manual.
  - 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 MECHANICAL/STRUCTURAL ENGINEER and obtain verbal approval to ensure no damage to plant equipment.
  - 5.3.3 Discuss routes for transporting heavy equipment through plant buildings with COGNIZANT MECHANICAL/STRUCTURAL ENGINEER and obtain verbal 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.)

#### TM-N1043-500 Appendix E Revision 0, Page 10 of 124

Number TMI - Unit 1 1301-9.1 Surveillance Procedure Title Revision No. **RB Structural Integrity Tendon Surveillance** 20 SPECIAL TOOLS, MATERIALS AND PERSONNEL QUALIFICATIONS 7.0 7.1 General NOTE CONTRACTOR must document any substitution of materials along with TMI-1 COGNIZANT MECHANICAL/STRUCTURAL ENGINEER approval. 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 being inspected and will support jacks during lift off measurement at each end. 7.1.2 Permanent 460 volt electrical outlets on top surface of ring girder for miscellaneous uses. 7.1.3 115 volt outlets on working platform to power hydraulic stressing jack, pumps, and other electrically-powered equipment. 7.1.4 Electrical cables or heavy duty extension cords as necessary for lights, hydraulic stressing jack pumps, and other miscellaneous power tools. 7.1.5 Lift for two (2) men and hand tools. ()7.1.6 Portable work platforms for use inside buildings. 7.1.7 Communications equipment for work crew communications. 7.1.8 Miscellaneous hand tools. 7.1.9 Solvent - for removing grease from around tendon anchorage and cleaning any stained concrete (CRC Natural Degreaser Aerosol or EPA 2000). Viscosity/Oil Industrial Solvent #16 may only be used if MSDS has been specifically approved for TMI use. Cleaning rags - approximately 3 bales. 7.1.10 7.1.11 Ambient temperature monitoring equipment. 7.2 **Detensioning/Retensioning Equipment** 7.2.1 (2) - tendon stressing rams (jacks) with 1600 KIPS or greater capacity. 0 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 Ø threaded anchor head. Ram must have a longer than standard chair piece to fit TMI dome tendons. A

#### TM-N1043-500 Appendix E Revision 0, Page 11 of 124

		Number
Tille	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
<b>RB Structural Integrit</b>	ty Tendon Surveillance	20

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.

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

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 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.

 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

- 7.3.4 Grid paper for showing concrete crack patterns at vertical and hoop tendons.
- 7.3.5 Magnifying glass, 5x (minimum)

buttonheads.

- 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.

### TM-N1043-500 Appendix E Revision 0, Page 12 of 124

			Number
j Title		TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
<i>,</i>	ural Integ	rity Tendon Surveillance	20
	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 measure	ement.
	7.3.11	Inside and outside micrometers for anchorage thread measur	ements.
	7.3.12	Visual inspection equipment to perform VT-3C and VT-1C exa	ams.
7.4	Equipm	ent for Greasing and End Cap Replacement	

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- 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	e quantity is estimate only. More or less may be required.			
0	Certified test report for grease is required indicating wate sulfide, nitrate, reserve alkalinity and moisture content.	er soluble chloride,		

- 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.
  - To be clearly labeled on top and side: "WASTE TENDON GREASE ONLY".
- 7.4.4 (Approximately 10) 5-gallon capacity cans with bails.
- 7.4.5 End Cap Consumables and Hardware per 1410-Y-83.

12

#### TM-N1043-500 Appendix E Revision 0, Page 13 of 124

Number TMI - Unit 1 1301-9.1 Surveillance Procedure Title Revision No. **RB Structural Integrity Tendon Surveillance** 20 8.0 PROCEDURE 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. A 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. } 0 Ensure calibration documentation signed, dated, and traceable to NIST. Ø 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 with: 0 tendon number, tendon end (shop/field), 0 € expected lift-off (predicted) force, and 0 previous 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. 8.1.6 Complete Rows 1 through 6, 8, 9, 10 and 12 of Data Sheet 4 for tendons to be detensioned. ( )

## TM-N1043-500 Appendix E Revision 0, Page 14 of 124

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			TMI - Unit 1	Number		
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Title				Revision No.		
<b>RB Struc</b>	tural Inte	grity Tend	lon Surveillance	20		
			NOTE			
		alues to be e able 7 of VM	entered in Rows 1 through 4 of Data Sheet 4 are i I-TM-2485.	given in		
	8.1.7		malization Factor (NF) obtained from applicable I in DC-5390-225.01-SE, on Data Sheet 5 for sele			
	8.1.8		dicted force, 0.95 predicted force, and 0.90 predi- 225.01-SE or supplementary calculation) for all s			
	8.1.9		g in areas exposed to steam vents, verify plant is a 8 area guidelines).	shut down. (Refer to		
8.2	Hoop a	nd Dome Te	ndon Inspection			
			NOTE			
			on of a given tendon has started, it should be con ssible to avoid unnecessary exposure of anchora			
)	8:2.1	Protect ro	of surface as required prior to starting inspection			
1	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 mater				
	8.2.4	During the	shall be regreased (filled) within 30 days maximu e 2009 surveillance, extension of the 30 day maxi ble Engineer, as documented in this surveillance	mum may be granted by the		
	8.2.5	Corrosion	Protection System			
		a.	Depressurize and remove end caps per 1410- Procedure SQ6.1.	Y-83 and PSC ISI Manual		
		b.	Inspect for presence of free water in end cap a procedure and PSC ISI Manual Procedure SQ			
		c.	Enter inspection results on Data Sheet 9.			
		0.				

#### TM-N1043-500 Appendix E Revision 0, Page 15 of 124

Number

### TMI - Unit 1 Surveillance Procedure

1301-9.1

Revision No.

# **RB Structural Integrity Tendon Surveillance**

Title

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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.
  - 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.

# TM-N1043-500 Appendix E Revision 0, Page 16 of 124

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(	Title	<b>C</b>	Revision No.
	<b>RB Structural Integrity Ten</b>	don Surveillance	20
	[	NOTE	]
	Crack widths 50.72.	s in concrete > 0.010" are potentially reportable per 10	CFR
	ë.	IF crack widths > 0.05" are identified, record and COGNIZANT MECHANICAL/STRUCTURAL EN evaluation and investigation to determine amoun upon containment structure and its continued inte	GINEER for IMMEDIATE t of structural impairment
	f.	IF any condition not meeting acceptance criteria document using sketches, photographs, etc. as a immediately to Cognizant Mechanical/Structural f	pplicable and report
	g.	CONTRACTOR shall ensure TMI-1 has evaluate condition prior to making condition inaccessible. provided to CONTRACTOR for his report.	
	h.	Cracks $\ge$ 0.050" must be repaired after TMI-1 Englevaluation. Repair will be per 1440-Y-23, "RB Correspondence."	
( ,	8.2.7 Lift-Off T	-est	
κ, 1	a.	Verify that anchor head treads are acceptable pe procedure. Completion of Data Sheet 8 is at the Engineer.	
	b.	IF NOT ACCEPTABLE anchor head thread condi notify COGNIZANT MECHANICAL/STRUCTURA	
	с.	Record calibration constants, ram area, ram iden Data Sheet 1.	lification number (I.D.) on
	d.	Measure and record thickness of shim stack on D	ata Sheet 1.
	e.	Lubricate anchorage washer threads with a small as required.	amount of bulk filler grease
	f.	Thread ram onto anchorage stressing washer and operating instructions.	l béaring plate per ram
	g.	Ensure full thread engagement of the coupler to the	he stressing washer.
	h.	Visually examine jack prior to each use for damage	je or deformation.
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#### TM-N1043-500 Appendix E Revision 0, Page 17 of 124

Number TMI - Unit 1 1301-9.1 Surveillance Procedure Revision No. Title **RB Structural Integrity Tendon Surveillance** 20 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 (IWL-2523.3). Í. IF lift-off is not achieved at jack force of 1592 KIPS, STOP, unload jack and immediately notify COGNIZANT MECHANICAL/STRUCTURAL ENGINEER. Observe the position of the anchorhead prior to applying pressure. Count the j. 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 k. 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. Slowly increase jack pressure until both feeler gages becomes loose enough m. to move. When this occurs, STOP increasing jack pressure and record jack pressure reading and corresponding force on Data Sheet 1. Complete Consecutive Three Trial Pressure Spread and Average on Data n. Sheet 1. ο. 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. CONTRACTOR shall record information on Data Sheet 1. р. Record gage pressure corresponding to official lift-off force on Data Sheet 1. q.

r. Record official lift-off force on Data Sheet 1.

#### TM-N1043-500 Appendix E Revision 0, Page 18 of 124

		Number
Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
RB Structural Integrity Tendon Surveillance		20

 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.

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	time.		
	NOTE		
DO NOT dete ends.	nsion 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.		
۷.	Verify force meets Acceptance Criteria specified in Step 9.3.		
Ŵ.	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		
	orded from RTD TE 655I, TE 655U or TE 655P in Control nternal temperature.		
<b>x</b> .	Enter As-Found average lift-off force from Data Sheet 2 in Column (1) of Data Sheet 5.		
у.	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.		
Ζ.	Verify average of all normalized lift-off forces in a group meets Acceptance Criteria of Step 9.3.		

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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.

## TM-N1043-500 Appendix E Revision 0, Page 19 of 124

		Number
) Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
<b>RB</b> Structural Integr	20	

8.2.8 Detension Tendon

## CAUTION

- 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).
- 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 maybe 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.

#### TM-N1043-500 Appendix E Revision 0, Page 20 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
; Title		Revision No.
RB Structural Integrity Tendon Surveillance		20

- 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.
- 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.

## TM-N1043-500 Appendix E Revision 0, Page 21 of 124

		TMI - Unit 1 Surveillance Procedure	Number 1301-9.1		
RB Structu	ral Integrity Ten	don Surveillance	Revision No. <b>20</b>		
	j.	Stress tendon to gauge pressure recorded in Ro actual pressure in Row 15.	w 7 of Data Sheet 4. Record		
	k.	Record ram extension in Row 17.			
	l.	Record tendon force at overstress in Row 16.			
	m.	Reduce ram pressure to the lesser of the follow (final gap will be less than the thickness of the s			
		(1) 200 psi above $(P'_{min} + P'_{max})/2$ from	data Sheet 1.		
		(2) P' _{max} force listed on Data Sheet 1.			
	n.	Perform lift-off to determine actual tendon force pressure.	and corresponding gauge		
	0.	Record final lift-off (Lock-Off) force in Column 6 of Data Sheet 6.			
	. р.	Verify that final lock-off force is between the Pre of ultimate tendon strength and document verific Sheet 6.			
)	q.	Complete Data Sheet 6 for all detensioned tend	ons.		
	r.	Record final gauge pressure, force, and shim sta Sheet 1.	ack thickness on Data		
	S.	For comparison of tendon elongations occurring Retensioning, complete Data Sheet 4.	at Original Stressing and		
	t.	Verify fractional difference in Row 10 on Part 4 of Indicate whether this criterion has been met on I			
	<b>u.</b>	IF NOT within ± 0.1, immediately notify COGNIZ MECHANICAL/STRUCTURAL ENGINEER and cause is wire failure or slip of wire in anchorage( 0.1 requires identification in the ISI Summary Re (10CFR50.55a).	investigate to determine if s). Difference of more than		
	<b>v</b> .	After all lift-off tests on re-tensioned tendons are Sheet 6.	complete, fill out Data		

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#### TM-N1043-500 Appendix E Revision 0, Page 22 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
ite		Revision No.
RB Structural Integrity Tendon Surveillance		20

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

1

- 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.
- 8.6 Perform 35 Year examinations and tests listed in Enclosure 7 and document results.

### TM-N1043-500 Appendix E Revision 0, Page 23 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title		Revision No.
RB Structural Integrity Tendon Surveillance		20

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.

- 8.7.1 Perform repairs per 1410-Y-83 (Reference 2.15).
- 8.8 Recalibrate all calibrated equipment at end of tendon surveillance.

## 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.
- 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 (vertical, dome, or hoop) is equal to or greater than the required minimum average tendon force at the anchorage for that type of tendon.

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 VM-TM-2485, 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;

#### TM-N1043-500 Appendix E Revision 0, Page 24 of 124

Number TMI - Unit 1 Surveillance Procedure 1301-9.1 ) Title Revision No. **RB Structural Integrity Tendon Surveillance** 20 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. 9.3.2.2 the measured forces in two tendons located adjacent to the tendon in 9.3.2.1 are not less than 95% of the predicted forces (Predicted Base Values); and ) 9.3.2.3 the measured forces in all the remaining sample tendons are not less than 95% of the predicted force. 9.3.3 IF the requirements of 9.3.1 and 9.3.2 are not met, extent of investigation into cause. including additional lift-off testing to determine cause and extent of such occurrence, shall be determined by COGNIZANT MECHANICAL/STRUCTURAL ENGINEER. 9.3.4 IF average value of selected tendon end forces required for lift-off falls below 90% Base Value, evaluate condition to determine extent of cause of the low lift-off force and to specify additional examinations deemed necessary to demonstrate acceptability of the pre-stressing system. IF minimum group average normalized tendon force is NOT MET on Data Sheet 5, an 9.3.5 additional sample of 4% with a minimum of 4 and a maximum of 10, of same group of tendons, should be inspected. (TMI-1 Guidance/not Reg. Guide). 9.3.6 IF results of the anchorage force statistical analysis show a significant probability that the mean for any tendon group will fall below the minimum required value prior to the late finish date of next scheduled surveillance, additional lift-off testing to determine the cause and extent of such occurrence shall be done as directed by the COGNIZANT MECHANICAL/STRUCTURAL ENGINEER. This evaluation shall be reported per Engineering Evaluation Report prescribed in IWL-3300. 9.3.7 IF total population of each group of sampled tendons meets criteria, structural integrity of containment shall be considered acceptable.

# TM-N1043-500 Appendix E Revision 0, Page 25 of 124

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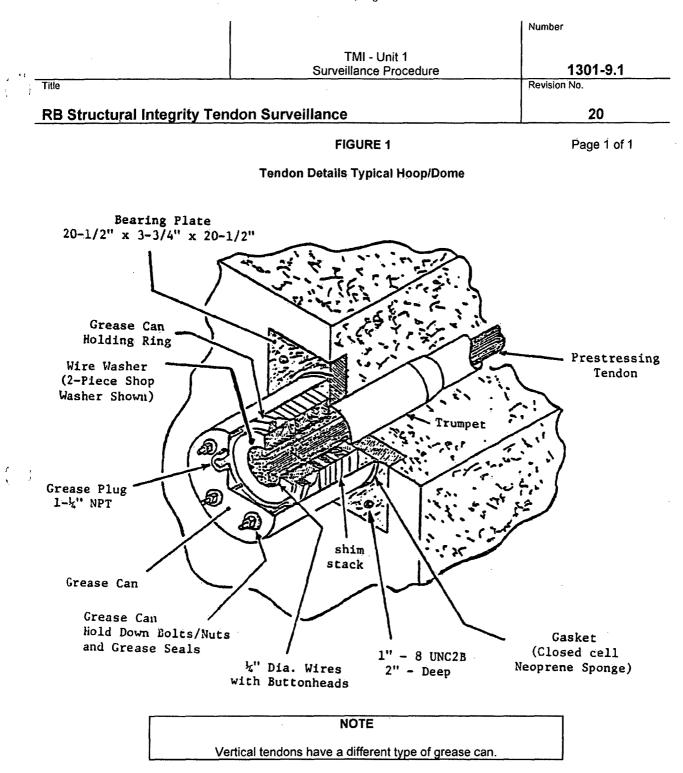
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i Title							Revision No.
RB S	tructu	ral Integ	rity Tendo	on Surveillan	се		20
		9.3.8	72 hours, t		st HOT STANDB	t been demonstrat Y within next 6 ho	ted to be acceptable within urs and in COLD
	9.4	Corrosio	n Protection	System Inspect	ion.		
		9.4.1	Grease sa Enclosure		nt levels and bas	e numbers meet ti	he criteria specified in
		9.4.2	Water in g	réase sample sh	all be that ratio o	of water to dry weig	ht does not exceed 10%.
		9.4.3	removed w the absolut the amoun	vithout Responsi te difference bet t replaced shall i	ble Engineer eva ween the amoun not exceed 10%	luation. The acce t of grease (CPM)	han the amount of grease ptance criteria limit is that removed from a tendon an ume (volume of end cap, shims).
		9.4.4	Presence	of free water.			
		9.4.5					ontainment exterior surface nel safety concerns.
١	9.5	Post Tes	t Calibration				
,		9.5.1				the pre-test calibins and gauges (IV	ration by more than the WL 2522[b]).
	9.6	All Data	Sheets comp	plete and signed	off.		
	9.7	possible brought t ENGINE	abnormal de o the attentio ER, a Survei	gradation of the on of, and evaluation	containment stru ated by the COG y Report (SDR) g	ucture. The condit NIZANT MECHAN	all be considered as a ion shall be immediately IICAL/STRUCTURAL dressed in the tendon
10.0	<u>REPO</u>	<u>RTS</u>					
	10.1			ld prepare writte test and inspect		s and conclusions	for inspection period for
		10.1.1	CONTRAC final report.		le pre and post-t	est calibration reco	ords in CONTRACTOR'S
	10.2			losure 7 is kept i n each inspectio		a commitments fo	r inspections as a result of
	10.3	TMI shall	submit a rej	oort on tendon s	urveillance to NF	C within 90 days f	ollowing completion.

#### TM-N1043-500 Appendix E Revision 0, Page 26 of 124

		Number
····	TMI - Unit 1 Surveillance Procedure	1301-9.1
) Title		Revision No.
<b>RB Structural Integr</b>	ity Tendon Surveillance	20

- 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.
  - 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.

#### TM-N1043-500 Appendix E Revision 0, Page 27 of 124



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· · · • • • • • • • • • • • • • • • • •				DATA SI Lift-Off Force I				<b>1301-9.1</b> <b>Revision 20</b> Page 1 of 1
Surveillance	• No	Tendon ID	Prod	licted Force (Fp)_	kip	Tendon Enc	I (Circle On	e): Shop / Field
Phase (Circl	le One): As-found /	Re-Tension	Ram ID		Ram Calibrat	ion Constants: A =		k =
Date	Temp: f	RB Interior •	F / Concrete Surfac	≫°F	No. Effective	Wires, N _w	_ Shim St	ack Htin.
				CAUTION				
		DO NOT EXCEEP A F	AM PRESSURE (	OF [(1,592 x N _w /	169) <u>- k] x 1,000</u>	)/A =	_psig	
<b>Trial</b> 1 2 3 4 5 6 7 8 9 10	Lift-Off Pressure, psig	Consecutive Three Trial Pressure Spread psi N/A N/A	Consecutive Three Trial Pressure Average p ¹ psig ^{1,2} <u>N/A</u> 	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	ter Rotation Rotation, Turns CW or CCW		or Re-tension Only, List Nominal Thickness of Each Shim Starting at Shim in Contact with Anchorhead
¹ N/A if 3 tria	l pressure spread > 2	25,000 / A =	psi					
² Re-tension	$P' range: P'_{min} = (F_p)$	- k) x 1,000 / A =	psig < P' < P' "	$m_{max} = [(1, 394 \times N_w)]$	/ 169) – k] x 1,0	00 / A =	psig	
For Re-Tens	sion Only: F _p < End	Lift-Off Force < 1394	↓ x N _w / 169;	<	<	Yes	/ No (Circ	le One)
Recorded by	: Signature		Date	/ Reviewed	by: Signature	QV	· · · · · · · · · · · · · · · · · · ·	Date
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TM-N1043-500 Appendix E Revision 0, Page 28 of 124

#### TM-N1043-500 Appendix E Revision 0, Page 29 of 124

TMI - Unit 1
Surveillance Procedure 1301-9.1
Revision No.

## **RB Structural Integrity Tendon Surveillance**

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Page 1 of 1

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

As-Found Lift Off Force, kip F > Facc Predicted F > Filim Tendon F_{acc} = 0.95 F_p Circle F_{llim} = 0.90 F_P Circle Force, FP Average Group ID kip Field End Yes or No Yes or No Shop End Force, F Yes / No Hoop Yes / No Yes / Nó Yes / No N/A Yes / No Yes / No Vertical N/A Yes / No Yes / No Dome Yes / No 
Notes: (Initial & Date)

## TM-N1043-500 Appendix E Revision 0, Page 30 of 124

		Number
Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
<b>RB Structural Integ</b>	rity Tendon Surveillance	20

## DATA SHEET 3

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#### TM-N1043-500 Appendix E Revision 0, Page 31 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title	Title	
<b>RB</b> Structural Inte	grity Tendon Surveillance	20
	DATA SHEET 4	Page 1 of 4

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

Tendon ID _____

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Surveillance No.

## 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, OSF force / elongation and number of effective wires are documented in construction records.

	Table 1	
Row, R	Parameter	Value
1	Shop End PTF Force	kip
2	Field end PTF force	kip
3	Mean PTF Force = (R1 + R2) / 2	kip
4	Shop End PTF Reference Distance	in.
5	Field End PTF Reference Distance	in.
6	Net PTF Reference Distance = R4 + R5	in.
7	Shop End OSF Force	kip
8	Field end OSF force	kip
9	Mean OSF Force = (R7 + R8) / 2	kip
10	Shop End OSF Reference Distance	in.
11	Field End OSF Reference Distance	iń.
12	Net OSF Reference Distance = R10 + R11	in.
13	Differential Force = R9-R3	kip
14	Differential Elongation = R12 – R6	in.
15	Number of Effective Wires	
16	Elongation Rate = R14 x R15 / R13	

# TM-N1043-500 Appendix E Revision 0, Page 32 of 124

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		TMI - Unit		Number	
Title		Surveillance Pro	ocedure	Revision N	<u>301-9.1</u>
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RB	Structural I	ntegrity Tendon Surveillance			20
		DATA SHEET Elongation / Tendon Fo Re-Tensioning Data for De-Te	rce Record		age 2 of 4
Tend	on ID			Surveillance No.	
		Part 2			
		Shop End Re-Tension	ing Data		
Ram	IĎ	Ram Area, A	in²	Ram k	_ kip
		NOTE			
	F	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 ay be done afte	lations	
		Table 2			
	Row, R	Parameter	Value	Signature	Date
	1	Number of Effective Wires			
	2	PTF Target Pressure	1,000 psi		l
	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		<b> </b>
	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	43.2.1	and the second
	16	OSF Actual Force = R15 x A/1000 - k	<u>kip</u>		
	17	OSF Reference Distance	in.	The second s	ANTEL DE N
	18	Differential Force ⊭ R16 – R4	Kip 🦾		A Marine of
	19	Differential Elongation = R17 - R5	· in,	- 这个人们又说了这个人,同于无法的思想的意思是是是是这些这些	Self the participation

## TM-N1043-500 Appendix E Revision 0, Page 33 of 124

							Number	
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Title			Surveillan	ice Pro	cedure		Revision No	<b>301-9.1</b>
RB	Structural li	ntegrity Ten	don Surveillance					20
			DATA S Elongation / Tend Re-Tensioning Data for I	on For	ce Record	ons	Ρ	age 3 of 4
Tend	don ID					Surveilla	ance No	
			<u>Part</u> Field End Re-Te		ng Data			
Ram	n ID		Ram Area, A		_ in ²	Ram k	<u></u>	_ kip
		number enter	NOT of effective wires entered ed for the shop end in Ta	in R1 r ble 2.	Also, the calc	ulations		
			ows 4, 16, 18 & 19 (shad ends of the tendon is com		iy be done an		ng	
			Table	<del>)</del> 3				
	Row, R		Parameter		Value	Sigr	nature	Date
,	1		Number of Effective	Wires				
}	2		PTF Target Pre	ssure	1,000 psi			
	3		PTF Actual Pre	ssure	psi			
	4	PTF Ac	tual Force = R3 x A/100	10 - k	kip			
	5		PTF Reference Dis	tance	in.			
	6	OS	F Maximum Force = R1	x 9.4	kip			
	7	OSF Max.	Pressure = 1000 (R6 +	k) / A	psi			
	8		essure Interval = R7/3		psi			
	9	Tar	get 1/3 Pressure = 1,000		psi			
	10		Actual 1/3 Pres		psi			
	11	<u></u>	1/3 Reference Dist		in.			ļ
	12	Ta	arget 2/3 Pressure = R9		psi			
	13		Actual 2/3 Pres	ssure	psi			
	14		2/3 Reference Dist	ance	in.			
	15	·	OSF Actual Pres	ssure	psi			
	16	OSF Acti	ual⊧Force∍= ,R15 x A/100	0+k	kip 👘	6 20 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	5	11.2
	I		OSF Reference Dist	ance	in.			
	17			L				
	17 18		Differential Force = R16	- R4	kip			

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# TM-N1043-500 Appendix E Revision 0, Page 34 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
) Title		Revision No.
RB Structural Integrity Tendon Surveillance		20

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

Tendon ID _____

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Surveillance No.

Page 4 of 4

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		-	

## **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  $\leq 0.1$ 

* For vertical tendon = R1 ** For vertical tendon = R4

Signature: _____ Date: _____

Yes _____

No _____

TM-N1043-500 Appendix E Revision 0, Page 35 of 124

1301-9.1 Revision 20 Page 1 of 1

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# DATA SHEET 5 Average of the Normalized Lift Off Force

<b>、</b>	Average of the Normalized Lift Off Force						
, <u>Tendon ID</u>	(1) Lift Off <u>Force</u>	(2) Normalizing Factor (NF)	(3) Normalized <u>Lift Off (1) + (2)</u>	(4) Acceptance <u>Yes No</u>			
Dome Tendons							
1.				(Average Equ to or greater than 1064 kips)			
Vertical Tendons		Total Avera	ige				
1.				(Average Equ to or greater than 1033 kips)			
}		Total Avera					
Hoop Tendons         1.				(Average Equ to or greater than 1108 kips)			
Cognizant Mech/Struct Reviewed By:	Engineer	Total Avera	ge Date:				
Performed By:			Data				

TM-N1043-500 Appendix E Revision 0, Page 36 of 124

1301-9.1

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#### **DATA SHEET 6 Retensioning Criteria Confirmation**

**Revision 20** Page 1 of 1

$\left( \right)$	Recensioning Criteria Commación													
( )	(1) TENDON ID	(2) NUMBER OF EFFECTIVE WIRES	(3) 70 % OF ULTIMATE STRENGTH [8.24 X (2)]	(4) PREDICTED BASE FORCE ¹	(5) AVERAGE [(3)+(4)]÷2	(6) LOCK-OFF FORCE	(7) (4)<(6)<(3) Yes / No							
	DOME													
	SHOP END													
	FIELD END		<u></u>	<u></u>		<u> </u>								
	SHOP END					Natural Science Science (Science Science)								
	FIELD END		una companya and a statement and											
	VERTICAL													
	SHOP END													
	SHOP END	<u></u>			<u> </u>									
	SHOP END	<u>.                                    </u>		- <u></u>	. <u></u> .		<u> </u>							
	HOOP TENDONS													
()	SHOP END													
	FIELD END													
	SHOP END						<b></b>							
	FIELD END			·····										
	SHOP END		<u></u>											
	FIELD END				······································									
	Cognizant Mech/Struct E Reviewed By:	ngineer			Date:									
F	Performed By:	1994 1994 - 1995 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1			Date:									

 $^{-}$  Predicted Base Force from DC-5390-225.01-SE or separate calculation.

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TM-N1043-500 Appendix E Revision 0, Page 37 of 124

#### DATA SHEET 7 Tendon Force Measurement Record

**1301-9.1 Revision 20** Page 1 of 1

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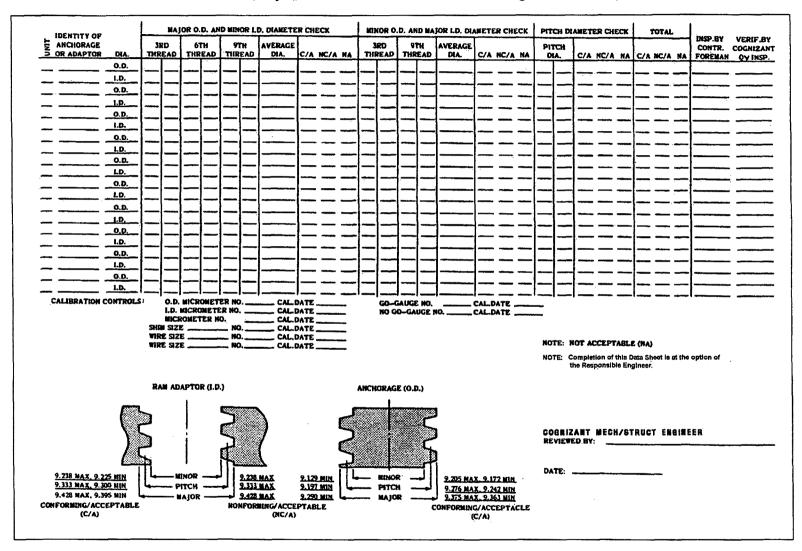
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#### 1301-9.1 Revision 20 Page 1 of 1

## DATA SHEET 8

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

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TM-N1043-500 Appendix E Revision 0, Page 38 of 124

## DATA SHEET 9 Tendon Anchorage Area Moisture/Free Water Inspection

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## 1301-9.1 Revision 20 Page 1 of 1

	Inspection	Period					
	Tendon No.	Location	Moisture/V (Yes or I		ee Moisture/Water-Quantity, Location	Date Insp.	Inspect. By (Initials)
1.							
2.	<u> </u>						
3.							
4.							
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6.							<u></u>
о. 7.							
8.							· · · · · · · · · · · · · · · · · · ·
9.					<u></u>		
10.						_	
11.							
12.	······································				·		
NOTE:	Locati	ion:					
		Tendons:	1 to 6 -	Buttress number at	Cognizant QV Inspector		
	Vartic	al Tendons:	Tor B-	end of tendon Top or Bottom	Verification By:	Dat	e:
		Tendons:		Number of buttress nearest	Cognizant Mech/Struct Engineer		
				to end of tendon	Review By:	Dat	e:

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கல் திரைப்புறைத் கூறுமாறும் பிருப்படல் கல் பண்டும் புறையில் இணைப்படு பிற்றும். அப்பில் பிற்றும் பிற்றும் பிற்று பிற்று

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## DATA SHEET 10 Tendon Anchor Head Rotation Inspection

1301-9.1 Revision 20 Page 1 of 1

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#### 1301-9.1 **Revision 20** Page 1 of 1

#### DATA SHEET 11 **Tendon Surveillance Program**

Gallons Removed*						Gallons I	Replaced*		
Tendon	Shop	Field	Sum (Q ₁ ) Shop &	Net Duct Volume; (Q _N ),	Shop	Field	Sum (Q ₂ ) Shop &		Acceptabl
No.	End	End	Field End	Gallons	End	End	Field End	$100 \times (Q_2 - Q_1) / Q_N, \%$	(Yes or No
·					·				<u></u>
			······			<u> </u>			
								. <u></u>	· · · · · · · · · · · · · · · · · · ·
						<u> </u>			
								<u></u>	
<u> </u>	<u></u>					<u> </u>	<u> </u>		
							·····		
-					-,				
)nly one or	nd of vor	ical tord	ons may be use	ad for	Cognizon		ontor		
emoval and					Cognizan Verificatio			Date:	
Differences	greater	than 4 ga	llons require TI	MI-1 evaluation. ume per 9.4.3.	Cognizan	t Mech/S	truct Enginee	r	

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Due to the relatively high coefficient of thermal expansion of the grease that is installed at a high temperature, experience during surveillances has been that the quantity of replacement grease frequently exceeds the arbitrary acceptance criteria. Exceeding the acceptance criteria is primarily an indication that an inspection and assessment for possible grease leakage within the structure is necessary. The visual examination of the anchorage and wire will determine whether the corrosion protection system is functioning effectively.

## TM-N1043-500 Appendix E Revision 0, Page 42 of 124

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		TMI - Unit 1		Number
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) Title				Revision No.
<b>RB Structural Inte</b>	grity Tendon Surve	eillance		20
		DATA SHEET 12		Page 1 of 1
	VT-1C /	VT-3C Examiner Qu	alification	
Name of Exami	iner	Employer		
		<u></u>		
		<u></u>		
<del>.</del>	<u></u>	<u> </u>		
	<u></u>			
I have reviewed the rec necessary, trained thes examinations of the con individuals are qualified	e individuals in the requitainment concrete surfa	irements applicable to ice. Based on this re-	o the performance of \	dividuals and have, as /T-1C / VT-3C e, training, I find that these
Responsible Engineer:	Name			
	Registration			
		State	License No.	Expiration

Signature _____ Date _____

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## TM-N1043-500 Appendix E Revision 0, Page 43 of 124

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			Number	
		Surve	TMI - Unit 1 eillance Procedure	1301-9.1
( )	Title			Revisión No.
	RB Structural Integrity Ten	don Surveillance	9	20
		DAT	A SHEET 13	Page 1 of 1
	F	Review / Acceptance	e of Contractor Procedures	
	Procedure Number / Title	Revision	Reviewed/Accepted by	Date
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#### TM-N1043-500 Appendix E Revision 0, Page 44 of 124

 TMI - Unit 1
 Number

 Surveillance Procedure
 1301-9.1

 Title
 Revision No.

 RB Structural Integrity Tendon Surveillance
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#### **ENCLOSURE 1**

Page 1 of 2

#### **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.

⁶ 5. Maintain 1 copy of current calibration with stressing unit at job site.

6. Include calibration data and certificate in surveillance report.

#### 1301-9.1 Revision 20 Page 2 of 2

## ENCLOSURE 1 Data Sheet Stressing Ram Calibration

## RAM DESCRIPTION

LOAD CELL ( RAM	CONSTANT CALCULATED	[		<u></u>		1	i	
TARGET	TARGET							AVERAGE
LOAD	PRESS.	AT 25% =		AT 50% = _	IN		IN	LOAD
(KIPS)	(PSIG)	LOADI		LOADIN		LOADIN		(KIPS)
		LOAD CELL	(KIPS)*	LOAD CELL	(KIPS)*	LOAD CELL	(KIPS)*	
<u>150K</u>								
<u>300K</u>								
500K								
600K								
700K							·	<u></u>
<u>800K</u>								<u> </u>
<u>900K</u>								
<u>1000K</u>								
<u>1100K</u>	······································							
1200K_								
1300K								•
1400K	·····							
<u>1500K</u>	·			<u> </u>	<u> </u>	·		
<u>1600K</u>						<u> </u>		

## RAM CALIBRATION CONSTANTS DETERMINED FROM SLOPE AND INTERCEPT OF STRAIGHT LINE FITTED TO AVERAGE LOAD AND PRESSURE DATA USING THE METHOD OF LEAST SQUARES. AREA_____IN² INTERNAL RESISTANCE(K)_____KIP *LOAD CELL X LOAD CELL CONSTANT ATTACH CERTIFICATIONS OF NIST TRACEABILITY FOR TESTING APPARATUS

APPROVED BY COGNIZANT MECH/STRUCT ENGINEER:	DATE
PREPARED BY LABORATORY TECHNICIAN:	DATE
VERIFIED BY LABORATORY SUPERVISOR:	DATE

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#### TM-N1043-500 Appendix E Revision 0, Page 46 of 124

		Number			
	TMI - Unit 1 Surveillance Procedure	1301-9.1			
Title					
<b>RB Structural Integrit</b>	20				

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## ENCLOSURE 2 Page 1 of 5 Scope of Each Scheduled Surveillance (Random Selection Per GAI DC-5930-225.02-SE) TABLE 1 Selected Tendons and Corresponding Inspection Periods

- r		······			1916	\$		Commonto					
			<del></del>	r		PECT			T	<b>.</b>		Times	Comments
	Tendon	1	2	3	4	5	6	7	8	9	10	Times Insp.	(Adjacent
Ļ	and the second secon		<u>  2</u>	.3	4	<u> </u>		<u>  /</u>			1 10		Tendons)
	11			<b> </b>	7. 2.8 9 9.9	ļ			ļ	X		1	10, 12
	14	+	ļ		• X		ļ		<b> </b>	<u> </u>		1	Done
ŀ	16	X	ļ	10 28 9			<b>_</b>	<b></b>		ļ		1	Done
	18			· · X	ļ		ļ		L			1	Done
Ļ	22				ļ	X	<b>_</b>	ļ	ļ	L		1	Done
	24		X		ļ							1	Done
	27	. X*	é.									1	Done
L	30				X							1	Done
L	31			X	<u> </u>			1				1	Done
	32				X		X	X	X	X	X	6	29, 33 Control
	40							X				1	Done
ſ	48		X									1	Done
ſ	50					XI						1	Done
Γ	53								Х			1	52, 54
Γ	55			Х							1	1	Done
ſ	61	X	T						1			1	Done
F	66	T	1						X			1	65, 67
ſ	72	T	X					<b></b>				1	Done
T	78	1					X	[		1		1	Done
F	84				X	Х	1				1	2	Done
ľ	86	X										1	Done
F	90	1								X	X	1	89, 91
F	97	1	X									1	Done
F	105			X			1					1	Done
F	108	1					İ				X	1	107, 109
r	114	1						Х				1	Done
F	119	1	X		_		[					1	Done
F	126						X					.1	Dóne
F	132	1								Х		1	131, 133
F	138	1		X				<u> </u>				1	Done
F	140	t							X			1	139, 141
$\vdash$	146	·							3 ( <b>7</b> 3 <b>-</b> 1)		× X	1	145, 147
┢	152		<u>├</u> }								X	1	151, 153
+	158	x	┟╍╌╴┨	;							<u>├-^`  </u>	1	Done
F	160	<u>⊢</u> ?−	<u>├</u>			X					<u>├</u>	1	Done
$\vdash$	164	<u> </u>				<u></u>		X			<u>├</u>	1	Done
L	TOTAL	5	5	5	5	3	3	<u>4</u>	4	4	4	42	X = Lift-Off

Lift-Off & Wire Test

#### TM-N1043-500 Appendix E Revision 0, Page 47 of 124

			Number		
c *•		MI - Unit 1 ance Procedure	1301-9.1		
$\left( \right)$	Title	,	Revision No.		
	RB Structural Integrity Tendon Surveillance		20		

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

								100P 1	END	UNS			
	Tendon	1	2	3	<u>INSI</u> 4	PECT	ION PE	RIOD	8	.9	10	Times Insp.	Comments (Adjacent Tendons)
	13-11		[	İ	ľ		T	1	Х			1	13-10, 13-12
	13-28	X		1			1					1	Done
	13-34	X		1	1		1					1	Done
	13-36	1		1	X		1					1	Done
	13-41									X		1	13-40, 13-42
	13-46	X			Τ					1		1	Done
	13-50							× X ×				1	Done
	24-19	·	X		ľ		1				ſ	1	Done
	24-20			X								1	Done
	24-21	<b>X</b> .										1	Done
	24-23										X	1	24-22, 24-24
	24-26				X							1	Done
)	24-28			X								1	Done
	24-30					X						1	Done
	24-33									Х		1	24-32, 24-34
	24-40						X					1	Done
	24-47	X										1	Done
	24-48		Х									1	Done
ļ	24-49			<b>X</b>								1	Done
l	24-50										X	1	24-49, 24-51
	24-51					X						1	Done
	35-10	X										1	Done
	35-11		X									1	Done
	35-16			Χ.								1	Done
	35-23						X					1	Done
	35-26				X							1	Done
[	35-28	X										1	Done
	35-29		X,									1	Done
[	35-33							X				1	Done
[	35-47						X					1	Done
ſ	35-49								Х			1	35-48, 35-50

X = Lift-Off

Page 2 of 5

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# TM-N1043-500 Appendix E Revision 0, Page 48 of 124

		Number				
	TMI - Unit 1 Surveillance Procedure	1301-9.1				
Title	lle					
<b>RB</b> Structural Integrity	7 Tendon Surveillance	20				

## **RB Structural Integrity Tendon Surveillance**

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Page 3 of 5

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

	Т			INS	PECTI	ON PE	RIOD		-			Comments
Tourdout	•						_				Times	(Adjacent
Tendon	1	2	3	4	5	6	7	8	9	10	Insp.	Tendons)
46-24		X			_		ļ	187-187-1894-1845-184			1	Done
46-25			ļ				<u> </u>	. X 🤇			1	46-23, 46-26
46-28	ļ	X	12 10 10 10 10 10 10 10 10 10 10 10 10 10				ļ	ļ			1	Done
46-30			X								1	Done
46-32			X								1	Done
46-34					्र						1	Done
46-37							X				1	Done
46-50									X		1	46-49, 46-51
51-11			X								1	Done
51-12	X										1	Done
51-13		X								3	1	Done
<b>51-1</b> 6										X	1	51-15, 51-17
51-43							X				1	Done
51-49									X		1	51-48, 51-50
62-10	X		X								2	Done
62-11		X									1	Done
62-13					X						1	Done
62-16	X										1	Done
62-18								X			1	62-17, 62-19
62-26				Х	X	X	Х	X	X	Х	7	62-25, 62-27 Contro
62-28			X								1	Done
62-30				Х							1	Done
62-41										Х	1	62-40, 62-42
62-47		X									1	Done
62-49						Х					1	Done
62-51			Х								1	Doné
62-53		X									1	Done
TOTAL	10	10	10	5	5	5	5	5	5	5	65	X = Lift-Off
	<u> </u>	<u> </u>	<u>' ' </u>		<u> </u>	<u> </u>	<u> </u>	I	<u>~</u>	<u> </u>		X = Lift-Off & Will

#### TM-N1043-500 Appendix E Revision 0, Page 49 of 124

			Number	
<b>.</b>		TMI - Unit 1 Surveillance Procedure	1301-9.1	
(	Title		Revision No.	
	<b>RB Structural Integrity Ten</b>	don Surveillance	20	

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

DOME TENDONS INSPECTION PERIOD Comments Times (Adjacent Tendon 2 3 5 7 Insp. 1 4 6 8 9 10 Tendons) 101 Х Done 1 102 X 1 Done 104 Х 1 Done* 116 Х 1 Done 122 Х 1 121, 123 130 Х 1 Done 131 х 1 Done 133 х 1 Done 141 Х 1 Done 143 Х 1 142, 144 X 145 1 Done 147 Х 1 Done 148 Х 1 Done 201 х Done 1 202 X 1 Done 203 Х 1 Done 213 X 1 212, 214 218 Х Х 2 Done Х 219 1 Done х 220 1 Done 225 Х Х Х Х X X 6 224, 226 Control X 230 1 229, 231 237 X 1 236, 238 X 248 1 Done 6 X 2 301 1 Done 303 [X] 1 302,304 Х 313 1 Done X 314 1 Done 316 х 1 Done 322 ۱ X ... 1 321, 323 X 334 1 Done 336 X 1 Done 342 [X] Х 1 341,343 346 Х 1 Done 347 Х 1 Done 348 х 1 Done 6 TOTAL 6 6 3 3 3 4 4 3 4 42 Χ= Lift-Off

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Lift-Off and Wire Test

Page 4 of 5

[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]).

## TM-N1043-500 Appendix E Revision 0, Page 50 of 124

Number

TMI - Unit 1 Surveillance Procedure .....

1301-9.1 Revision No.

20

## **RB Structural Integrity Tendon Surveillance**

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## ENCLOSURE 2 (Cont'd)

Page 5 of 5

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## Table 2

# Tendons Selected for Detensioning and Tendon Wire Removal/Lab Tests

Inspection		Tendon Location	1
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- <u>3</u> 22
10	V-146	H-24-23	D-237

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		TM-N1043-500 Appendix E Revision 0, Page 51 of 124	
		• • •	Number
		TMI - Unit 1 Surveillance Procedure	1301-9.1
) Title			Revision No.
<b>RB</b> Structu	ral Integrity Ten	idon Surveillance	20
		ENCLOSURE 3	Page 1 of 6
	C	DLLECTION/LAB ANALYSIS OF FILLER GREASE	
PURPOSE:	Confirm the ability	of filler grease to perform its intended corrosion pro	ptection function.
LIMITS AND I	PRECAUTIONS:	· · ·	
1.		lastic paddles or spatulas to scoop out bulk filler gre IOT use metal implements.	ase from around the
PROCEDURE	E		
1.	Inspection Grease	9:	
	1.1 Contact	TESTING LABORATORY to determine size of sam	ple required.
	contain	ne random sample of bulk filler grease from tendon of supplied either by TESTING LABORATORY or TRACTOR.	
(* * ) )		an identification tag to container with tendon group, cified. (Example: Dome 105NW)	tendon number, and tendon

2. **Fresh Grease** 

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- Commercial Grade Dedication of new bulk filler grease requires that at least 25% of the 2.1 barrels for each grease lot number be sampled for lab analysis.
- 2:2 Attach an identification tag to each sample and corresponding identification on each drum sampled.
- 3. Old Grease (to be reused)
  - 3.1 If grease obtained from tendons is intended to be reused to refill tendons (termed "old grease") perform lab analysis on "old grease".
  - Heat each container of old grease to be reused to approximately 150° F to ensure a 3.2 homogeneous mixture.
  - Attach an identification tag to each sample and corresponding identification to each drum. 3.3
- Package all samples and ship to TESTING LABORATORY in such a way that condition of grease is 4. not adversely affected or altered.

#### TM-N1043-500 Appendix E Revision 0, Page 52 of 124

		Number
·	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title		Revision No.
<b>RB Structural Integrity T</b>	endon Surveillance	20

## ENCLOSURE 3

Page 2 of 6

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:

- (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,

 $\begin{array}{l} \mathsf{B} = \mbox{milliliters NaOH} \\ \mathsf{N}_{\mathsf{A}} = \mbox{normality of } \mathsf{H}_2\mathsf{S04} \\ \mathsf{N}_{\mathsf{B}} = \mbox{normality of NaOH solution} \\ \mathsf{W} = \mbox{weight of sample in grams} \end{array}$ 

#### TM-N1043-500 Appendix E Revision 0, Page 53 of 124

		Number	
	TMI - Unit 1 Surveillance Procedure	1301-9.1	
) Title		Revisión Nó.	
<b>RB Structural Integrity Ten</b>	don Surveillance	20	

#### **ENCLOSURE 3**

#### Page 3 of 6

(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.</p>

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1301-9.1 Revision 20 Page 4 of 6

## ENCLOSURE 3

## 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)	<u>WATER/DRY</u> <u>WEIGHT (2)</u> <u>%</u>	RESERVE ⁽¹⁾ ALKALINITY (BASE NUMBER)
1						
2	<b></b>		······································		. <u></u>	
3		<u> </u>				
4		<u></u>				
5		<u> </u>				
(1) ACCEPTANCE C ENCLOSURE 3.	RITERION IS GIVE	N ON PAGE 2 OF		TORY TECHNICIAN RED BY:		DATE:
(2) ACCEPTANCE C TENDON END: N		MAXIMUM BY WEIGHT.		Tory Supervisor DBY:		DATE:
				ANT MECH/STRUCT E		_DATE:

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**1301-9.1 Revision 20** Page 5 of 6

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## ENCLOSURE 3

## Data Sheet 2

## Laboratory Analysis of Bulk Filler Grease

## Vertical Tendons

INSPECTION PERIOD

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SAMPLE IDENTIFICATION	<u>TENDON</u> <u>END</u>	CHLORIDES ⁽¹⁾ (PPM)	NITRATES ⁽¹⁾ (PPM)	SULFIDES ⁽¹⁾ (PPM)	<u>WATER/DRY</u> <u>WEIGHT (2)</u> <u>%</u>	<u>RESERVE⁽¹⁾ ALKALINITY (BASE NUMBER)</u>
1						
2						
3	<b></b>					
4		<u></u>				
5:		<u> </u>				
				·		
(1) ACCEPTANCE C ENCLOSURE 3.	RITERION IS GIVE	N ON PAGE 2 OF		TORY TECHNICIAN		DATE:
(2) ACCEPTANCE C TENDON END: T		MAXIMUM BY WEIGHT.		ORY SUPERVISOR		DATE:
				NT MECH/STRUCT E		DATE:

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## ENCLOSURE 3

#### 1301-9.1 Revision 20 Page 6 of 6

## Data Sheet 3

1

## Laboratory Analysis of Bulk Filler Grease

## Hoop Tendons

INSPECTION PERIOD

SAMPLE	TENDON END	CHLORIDES ⁽¹⁾ (PPM)	NITRATES ⁽¹⁾ (PPM)	SULFIDES ⁽¹⁾ (PPM)	WATER/DRY WEIGHT (2) <u>%</u>	<u>RESERVE⁽¹⁾ ALKALINITY (BASE NUMBER)</u>
1						·
2		-				
3						
4						
5						
6						

(1) ACCEPTANCE CRITERION IS GIVEN ON PAGE 2 OF ENCLOSURE 3.

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(2) ACCEPTANCE CRITERION IS 10% MAXIMUM BY WEIGHT. TENDON END: BUTTRESS NUMBER

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LABORATORY TECHNICIAN PREPEARED BY:	DATE:
LABORATORY SUPERVISOR VERIFIED BY:	DATE:
COGNIZANT MECH/STRUCT ENGINEER	DATE:

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#### TM-N1043-500 Appendix E Revision 0, Page 57 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title		Revision No.
RB Structural Integr	ity Tendon Surveillance	20

#### **ENCLOSURE 4**

Page 1 of 5

## TENDON RANDOM WIRE REMOVAL/PHYSICAL TESTING

(See Table 2 of Enclosure 2 for three 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

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

#### TM-N1043-500 Appendix E Revision 0, Page 58 of 124

		Number
Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revisión No.
<b>RB Structural Integrity</b>	20	

## ENCLOSURE 4

Page 2 of 5

- 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.

## ŅOTE

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

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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.

# TM-N1043-500 Appendix E Revision 0, Page 59 of 124

				Number	
		<u></u>		TMI - Unit 1 Surveillance Procedure	1301-9.1
Title					Revision No.
RB :	Structu	ral Integrity Tendon Surveillance			20
				ENCLOSURE 4	Page 3 of 5
	7.4	TENS	ILE TEST		
•		a.		YIELD STRENGTH, ULTIMATE TENSILE STRE TION AT ULTIMATE TENSILE STRENGTH.	NGTH, and PERCENT
		b.	Record th	is data on the Data Sheet 2 of this enclosure.	
		C.	Produce s	stress strain curves for each test section.	
ACCE	EPTANC	E CRITE	RIA - TENDO	N RANDOM WIRE PHYSICAL TESTING	
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.				
4.	Mecha	anical/St	ructural Engine	n on the wire, or the wire fails the tensile test, the <u>eer</u> must evaluate. Each case shall be treated as a dreported to the NRC.	

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## TM-N1043-500 Appendix E Revision 0, Page 60 of 124

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Title		TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.	
RB	Structural Integrity Tendon Surve	eillance	20	
		ENCLOSURE 4 Data Sheet 1 ndon Wire Inspection Data	Page 4 of 5	
ΪN2Ι				
	Tendon Identification:			
	25'			
	50'			
	75'			
	100'			
	125'			
	150'			
	175'			
)	180'	185'		
	185'	190'		
		Wire Sam	ple Diameters	
	Sample for Tensile Test ⁽²⁾	At 1/4-Points	At Breaking <u>Points</u>	
	Sample 1:ft toft			
	Sample 2:ft toft	<u> </u>		
	Sample 3:ft toft		<u></u>	
		NOTE		
	as shown on the abo 2. Sample shall include or pitting <u>if</u> they exist 3. Diameter at Breaking	ns of deterioration shall be indicated fu ove chart. a areas representative of significant co on removed tendon wire. g Point is to be interpolated from 1/4-p side of breaking points.	rrosion	
Labo	oratory Technician prepared by:		Date	
Laboratory Supervisor Verified by:				
			Date	

TM-N1043-500 Appendix E Revision 0, Page 61 of 124

1301-9.1 Revision 20 Page 5 of 5

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# ENCLOSURE 4 Data Sheet 2 Tendon Wire Test Results

1-· ----

INSPECTION PERIOD					
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
DOME					
1				- <u></u>	
2					
3					
VERTICAL					
1					·······
2.	<u></u>	· · · · · · · · · · · · · · · · · · ·			
3.					
HOOP					
1			·		
2					
3.					• • • • • • • • • • • • • • • • • • •
NOTES:			Laboratory Technician Prepared By:		Date
	f this enclosure. end of zero length as indica	ited on Data Sheet 1 of	Laboratory Supervisor		
(3) Yield stress is do (4) At Ultimate Tens	efined per ASTM A421.		Verified By:		Date
(4) At Uninate rens	sie ouenym.		Cognizant Mech/Struct En Approved By:		Date

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		Number
/	TMI - Unit 1 Surveillance Procedure	1301-9.1
j Title		Revision No.
<b>RB Structural Integrity Te</b>	ndon Surveillance	20

# **ENCLOSURE 5**

# **GREASE CAN REMOVAL/REPLACEMENT/REGREASING**

DELETED

Refer to 1410-Y-83 (Reference 2.15)

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#### TM-N1043-500 Appendix E Revision 0, Page 63 of 124

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
) Title		Revision No.
<b>RB Structural Integ</b>	grity Tendon Surveillance	20
	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).

#### TM-N1043-500 Appendix E Revision 0, Page 64 of 124

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) Title	<u></u>		TMI - Unit 1 Surveillance Procedure	Number <b>1301-9.1</b> Revision No.
RB St	ructu	Iral Integ	grity Tendon Surveillance	20
			ENCLOSURE 6	Page 2 of 16
	3.3	AFTER	LIFT-OFF TEST AND, IF APPLICABLE, AFTER RETENSIONIN	IG
		3.3.1	Inspect for buttonheads which are missing or which protrude. Sheet 1, 2, 3, and 4 of this enclosure.	Document on the Data
		3.3.2	Perform VT-1 inspection of buttonheads. Document active co	rrosion and damage.
		3.3.3	Document buttonhead inspection results on Data Sheets 1, 2,	3, and 4 of this enclosure.
		3.3.4	Perform VT-1 inspection of anchorage washer/shims/bearing   and corrosion on Data Sheets 1, 2, and 3 of this enclosure	plates. Document cracks
		3.3.5	Perform VT-1C of concrete for a distance of 2 feet extending on plate, for cracking or voids and for gaps between bearing plate optical comparator or feeler gages.	
		3.3.6	Document findings on Data Sheets 5, 6, or 7 of this enclosure. Sheet 9, of this enclosure as necessary to identify significant o	
)		3.3.7	Immediately after inspection of the buttonheads, butter the end clean bulk filler grease completely coating all buttonheads to p protection until the tendon is bulk filled.	
	4.	ACCEP	TANCE CRITERIA	
		4.1	No evidence of cracking in anchor heads, shims, washers, or h	pearing plates (IWL 3221.3).

- 4.2 No anchorage assembly shims, buttonheads or washers with 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>.

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		Number
) Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
<b>RB Structural Integrity</b>	rendon Surveillance	20
	ENCLOSURE 6	Page 3 of 16
4.4 No	pearing plates with active corrosion.	
	ring plates with evidence of active corrosion are subject to her evaluated by the <u>Cognizant Mechanical/Structural Eng</u>	
	cks in surrounding concrete face greater than 0.010 inch v ineering evaluation.	vide shall receive
repa	cks in surrounding concrete face greater than/equal to 0.0 nired after appropriate engineering evaluation. Repair per edure.	
4.8 Cra	cks larger than 0.020 shall be monitored in future Tendon	Surveillances until repaired.
prev	ny missing, broken and/or damaged wires are detected, c rious inspections to determine if damage was noted previo a Sheets 1, 2, and 3 under "comments" section and on Da	ously. Record findings on
4.10 Ens	ure Data Sheets 1 through 10 of this enclosure are filled o	ut and signed.

CONCRETE CRACKS AT 9 SELECTED DOME TENDON ANCHORAGE AREAS IDENTIFIED ON DATA SHEET 8 of this enclosure (Periods 4, 5 6, and 7)

1. PURPOSE

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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.

#### TM-N1043-500 Appendix E Revision 0, Page 66 of 124

		Nümber
	TMI - Unit 1 Surveillance Procedure	1301-9.1
Title		Revision No.
<b>RB Structural Integ</b>	rity Tendon Surveillance	20
	ENCLOSURE 6	Page 4 of 16

# 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

Results of crack measurements made during the 3 years after SIT are filed under 1301-8.2, "Ring Girder Surveillance Program". (The procedure has since been cancelled and the procedure number was re-assigned to 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

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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.

#### TM-N1043-500 Appendix E Revision 0, Page 67 of 124

		Ňumber
Title	TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.
RB Structural Integrity 1	endon Surveillance	20
	ENCLOSURE 6	Page 5 of 16

#### 2. PROCEDURE

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.

NOTE

- 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.

#### 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.

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## 1**301-9.1** Revision 20 Page 6 of 16

# ENCLOSURE 6

# Data Sheet 1 Anchorage Assembly Surveillance Inspection Dome Tendons

INSPECT	TION P	ERIO	)			-											INSP. BY	VERIF. BY
TENDON	END		BUT	TTONHEADS		ST	RESSING \ & NU			SHIMS	5		BEARING I	PLATE	DATE INSP,	COMMENTS	CONTR.	COGNIZANT
			NO. OF MISSING, BROKEN, AND/OR DAMAGED	·/	<b>`</b>		/	~		/	`		/	<u> </u>				
I.D. 1	Location 2		WIRES 4	CORR. 5	SKETCHED 6	CORR. 7	CRACKS	SKETCHED 9	CORR. 10	CRACKS	SKETCHED	CORR. 13	CRACKS	SKETCHED 15	16	17	18	19
1																		
		<del></del> .								<u> </u>								
2						<u> </u>	<u> </u>								—			
3			······································				. <u></u>					<u> </u>						
		<u> </u>						· · · ·										
4				<u> </u>						<del></del>		<u> </u>		<u> </u>				
F				<u></u>			<u> </u>											
5					<u></u>						1				—			·····
6																		
	<del></del>						<u></u>	<u> </u>			<u> </u>							
LEGEN	ND																	
GENE	RAL	TEI	NDON END	LOCATION														
Y = YE N = NC		IDE	INTIFY TEN	DON END ( <u>S</u>	HOP OR <u>F</u> IE	LD) AN	D NW, NE	, SW, SE										

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1301-9.1 Revision 20 Page 7 of 16

# ENCLOSURE 6

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#### Data Sheet 2 Anchorage Assembly Surveillance Inspection Vertical Tendons

INSPECTION PERIOD

TENDON	END		B(	UTTONHEADS	<u></u>	ST	RESSING V & NUT			SHIMS	;	1	BEARING F	PLATE	DATE INSP.	COMMENTS	INSP. BY CONTR. FOREMAN	VERIF. BY COGNIZANT QV INSP.
			NO. OF MISSING, BROKEN, AND/OR DAMAGED				^	<b>`</b>		^			^	<u>`                                    </u>			·	·
1.D. 1	Location 2	1 Corr. 3	WIRES	CORR. 5	SKETCHED 7	CORR. 8	CRACKS 9	SKETCHED 10	CORR.	CRACKS	SKETCHED	CORR. 14	CRACKS 15	SKETCHED	17	18	19	20
1																		
2				<u></u>														
3		_																
			<u> </u>		-			<u> </u>		- <u>1</u>								
4															—	<u> </u>	<u></u>	
5		<u></u>							<u> </u>	. <u></u>					<u></u>			
		—					<u> </u>		<u> </u>		<u> </u>	·						
6												<u> </u>						
	. <u></u>					—	<u> </u>											

#### **LEGEND**

GENERAL TENDON END-LOCATION

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

the the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second

N = NO

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# **1301-9.1 Revision 20** Page 8 of 16

# **ENCLOSURE 6**

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# Data Sheet 3 Anchorage Assembly Surveillance Inspection Hoop Tendons

INSPECT	TION PE	ERIOD															NCD DV	VERIF. BY
TENDON	END		В	UTTONHEADS		ST	RESSING W & NUT			SHIMS	5.		BEARING F	LATE	DATE INSP.	COMMENTS	CONTR.	COGNIZANT
			NO. OF MISSING, BROKÉN, AND/OR	·^		<u>,</u>	^			/	,			<u> </u>				
I.D. 1	Location 2	1	AND/OR DAMAGED WIRES 4	CORR. 5	SKETCHED 6	CORR. 7	CRACKS 8	SKETCHED	CORR. 10	CRACKS	SKETCHED 12	CORR. 13	CRACKS	SKETCHED	16	17	18	19
1							:											
2										<u>.</u>					—			
3																<u></u>		
4							·		<u></u>					·····				
		<u> </u>		. <u></u> ,			<u> </u>		<u> </u>									
5							·											
6		<u> </u>		. <u> </u>				<u> </u>										
LEGEN		<u> </u>	- <u> </u>				<u> </u>							<b></b>				

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GENERAL TENDON END-LOCATION

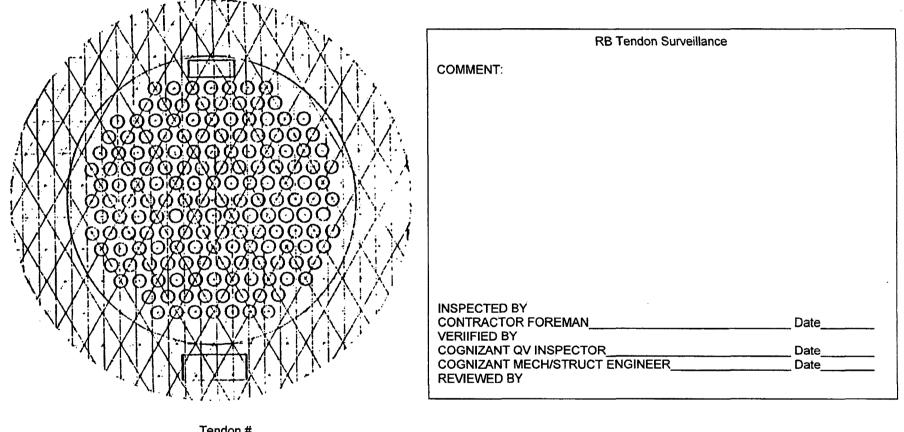
Y = YES IDENTIFY TENDON END (SHOP OR FIELD) AND NUMBER OF BUTTRESS (1 TO 6) AT TENDON END N = NO

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### ENCLOSURE 6 Data Sheet 4

# **Tendon Buttonhead Inspection**



INSPECTION PERIOD

Tendon #_____ END: FIELD____(1 piece washer) _____(2 piece washer)

TM-N1043-500 Appendix E Revision 0, Page 71 of 124

<u></u>					~	~
			ENCLOSURE 6		<b>1301-9.1</b> <b>Revision 20</b> Page 10 of 16	3
In a section Devi		-	Data Sheet 5 e Area Concrete Crack Inspecti Dome Tendons	on		
Tendon <u>No.</u>	Location	Remarks about Cracking Pattern	Cracks with width >0.01" Location(A) Width (IN.)(B)	Date Insp.	Insp. By Contr. <u>Foreman</u>	Verify. By Cognizant <u>QV Insp.</u>
1				· •		
2						
3	÷					TM-N104
4		· · · · · · · · · · · · · · · · · · ·				TM-N1043-500 Appendix E Revision 0, Page 72 of 124
5						f 124
6						
NOTE: (A) Ider		op or <u>F</u> ield) and NW, NE, SW, SE	Cognizant Me Reviewed By:	ch/Struct Engineer		Date:

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

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`~~			ENCLOSURE 6 Data Sheet 6 prage Area Concrete Crack Inspectic Vertical Tendons	n	<b>1301-9.1</b> <b>Revision 20</b> Page 11 of	
Inspection Period 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. Foreman	Verify. By Cognizant <u>QV Insp.</u>
1				<u> </u>		
2				<u></u>		<u> </u>
3						
	<u> </u>			• •		
4						

5.

6.

7.

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NOTE: (A) Location: 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/Struct Engineer Reviewed By:_____ Date:

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# 1301-9.1 Revision 20 Page 12 of 16

#### ENCLOSURE 6 Data Sheet 7 Tendon Anchorage Area Concrete Crack Inspection

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				Hoop Tendo	ons			
Inspection	Period			Cracks with	width >0.01"	Date	Insp. By	Verify. By
Tendon	n <u>No. Lo</u>	cation	Remarks about Cracking Pattern	Location(A)	Width (IN.)(B)	Insp.	Contr. Foreman	Cognizant QV Insp.
1							4.5	
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3		<u> </u>			<u> </u>		•	<u> </u>
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4								
	_			<u> </u>				Revision 0, Page 74 of 124
5								ion 0
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6								e 74
	_							of 12
7	<u> </u>	· ·					<u></u>	n 4
	_							
8						·		<b></b>
9	<u></u>			<u></u>	<u> </u>			
	-	<u></u>						
10								·····
NOTE:	(A) Location: Identify Tendon End 1 to 6 - Number of E (B) If concrete cract	Buttress At End of T	endon	Cognizant Mech/Struc Reviewed By:	t Engineer		Date:	

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# **1301-9.1 Revision 20** Page 13 of 16

# ENCLOSURE 6

#### Data Sheet 8 Concrete Crack Growth Inspection Dome Tendons

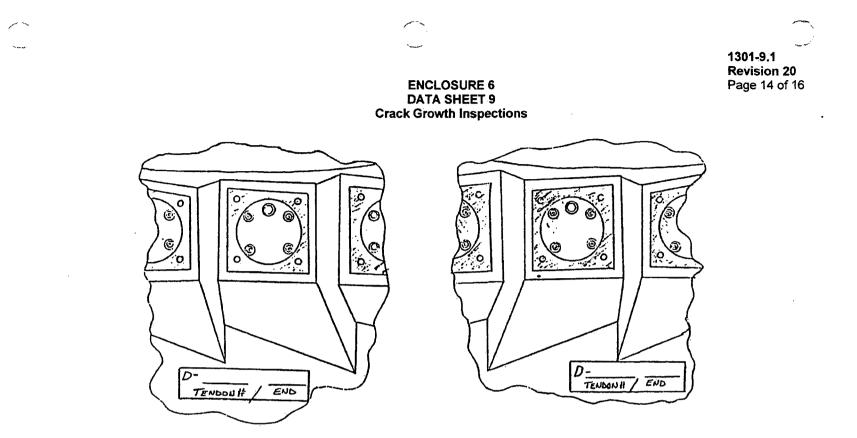
Inspection Period	1		•			
Tendon <u>No.</u>	Location	Remarks about Cracking Pattern	Cracks with width >0.01" <u>Location(A) Width (IN.)</u> (B)	Date Insp.	Insp. By Contr. <u>Foreman</u>	Verify. By Cognizant <u>QV Insp.</u>
1. <u>D-103</u>	<u>NE END</u>		·			
2. <u>D-118</u>	SW END					
3. <u>D-203</u>	NE END					
4. <u>D-218</u>	SE END				·	
5. <u>D-225</u>	NW END					Revis
6. <u>D-249</u>	<u>SE END</u>					TM-N1043-500 Appendix E Revision 0, Page 75 of 124
7. <u>D-313</u>	<u>SE END</u>		<del>,</del>			Page
8. <u>D-329</u>	SW END					75 of 1
9. <u>D-334</u>	<u>NW END</u>					124 
10						
11			<u> </u>	<u></u>		
12			<u></u>	<u></u>		
NOTE: (A) Lo	ocation:					

Identify Tendon End (<u>S</u>hop or <u>F</u>ield) and NW, NE, SW, Se (B) If concrete crack width > 0.01", provide sketch

, and the second

Cognizant Mech/Struct Engineer Reviewed By:_____

Date:



Choose the sketch which is most appropriate and plot the observed cracks.

TM-N1043-500 Appendix E Revision 0, Page 76 of 124

INSPECTED BY CONTRACTOR	DATE
VERIFIED BY COGNIZANT QV INSPECTOR	DATE
REVIEWED BY COGNIZANT MECH/STRUCT ENGINEER	DATE

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#### ENCLOSURE 6 Data Sheet 10 General Containment Inspection Results

Mat Foundation in Tendon Gallery

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1301-9.1 Revision 20 Page 15 of 16

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**Tendon Grease Caps** Buttress 1 to 2 . Buttress 2 to 3 Buttress 3 to 4 Cognizant Mech/Struct Engineer Reviewed By: _____ Date: _____ Performed By: _____ Date: _____ 77

TM-N1043-500 Appendix E Revision 0, Page 78 of 124

#### **ENCLOSURE 6** Data Sheet 10 **General Containment Inspection Results**

**1301-9.1 Revision 20** Page 16 of 16

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Buttress 5 to 6		
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Cognizant Mech/Struct Enginee	er	
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	TMI - Unit 1 Surveillance Procedure	1301-9.1
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# **ENCLOSURE 7** Additional Inspection Commitments Due to Abnormalities Previously Documented in 1301-9.1

Page 1 of 2

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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.

#### TM-N1043-500 Appendix E Revision 0, Page 80 of 124

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			Number	
•		TMI - Unit 1 Surveillance Procedure	1301-9.1 Revision No.	
	al Integrity Tendon Surveil	egrity Tendon Surveillance		
		ENCLOSURE 7	Page 2 of 2	
Inspection Period	Abnormality Noted	Commitment	Comments	
7* (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	
	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 Exạm	
	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	
m <u> </u>	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.

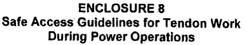
** Reference Topical Report (T.R.) No. 183, Tendon Surveillance 30th Year (Period 8) for details surrounding the abnormalities noted and commitments made to the regulator in that report.

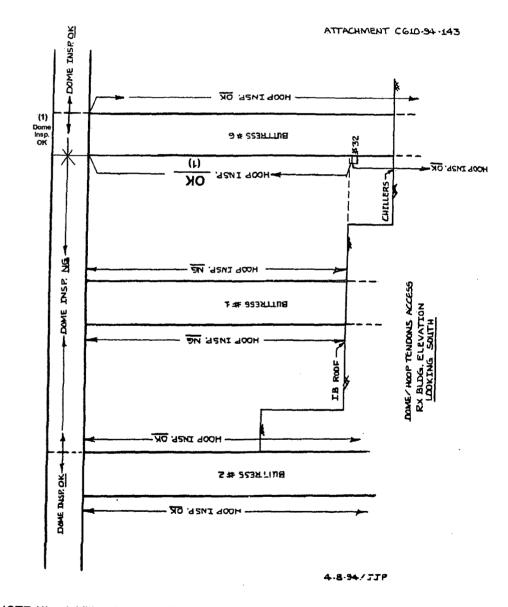
TM-N1043-500 Appendix E Revision 0, Page 81 of 124

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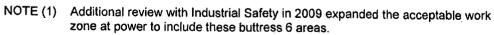
		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
( ) Title		Revision No.
<b>RB Structural Integ</b>	rity Tendon Surveillance	20
	ENCLOSURE 8	Page 1 of 1





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81



ER-AA-335-018 Revision 5 Page 1 of 32 Level 2 – Reference Use

# 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

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- 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. <u>Precautions</u>

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- 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

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- 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 <u>shall</u> 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.

- 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

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ER-AA-335-018 Revision 5 Page 4 of 32

- 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 shall 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

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

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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 <u>shall</u> 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.
  - A. 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.

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- 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

ER-AA-335-018 Revision 5 Page 6 of 32

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

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# 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.

ER-AA-335-018 Revision 5 Page 7 of 32

- 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>

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- 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;

ER-AA-335-018 Revision 5 Page 8 of 32

- 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

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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>

ER-AA-335-018 Revision 5 Page 9 of 32

- 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 <u>shall</u> be as qualified in Paragraphs 3.3.3 or 3.3.4.
- 4.5. <u>Remote Examination</u>

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- ) 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
    - 1. 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

ER-AA-335-018 Revision 5 Page 10 of 32

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

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**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.

ER-AA-335-018 Revision 5 Page 11 of 32

- 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

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**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

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ER-AA-335-018 Revision 5 Page 12 of 32

**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.

ER-AA-335-018 Revision 5 Page 13 of 32

- 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

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**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

ER-AA-335-018 Revision 5 Page 14 of 32

**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

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**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.

- 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

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**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.

ER-AA-335-018 Revision 5 Page 16 of 32

- 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. Standards for Examination Category L-A, Class CC Components (Concrete)
- 4.7.1 Examination Boundary

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- 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.

ER-AA-335-018 Revision 5 Page 17 of 32

- 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;
  - 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

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The examination boundary shall include containment tendon anchorage hardware including bearing plates, anchor heads, shims, wedges and wire button-heads, as a minimum.

ER-AA-335-018 Revision 5 Page 18 of 32

- 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;

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- 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;
  - 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. Evaluation

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- 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.
  - 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. Final Conditions

- 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.

ER-AA-335-018 Revision 5 Page 21 of 32

- 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.
- 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. <u>CRACK</u> A complete or incomplete separation, of either concrete or masonry, into two or more parts produced by breaking or fracturing.
- A.1.1. <u>CHECKING</u> Development of shallow cracks, closely spaced by irregular intervals on the surface of plaster, cement paste, mortar, or concrete.

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- 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. <u>HAIRLINE CRACKS</u> 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. <u>SHRINKAGE CRACKING</u> 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. <u>**TEMPERATURE CRACKING**</u> 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.

ER-AA-335-018 Revision 5 Page 23 of 32

# ATTACHMENT 1 Definitions of Discontinuities in Concrete Page 2 of 6

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- A.2. <u>DETERIORATION</u> 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. <u>BLISTERING</u> 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. <u>CAVITATION DAMAGE</u> 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.</u>
- A.2.7. <u>DEFLECTION</u> 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. <u>DELAMINATION</u> 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.

ER-AA-335-018 Revision 5 Page 24 of 32

# 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.

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- A.2.12. **<u>DUSTING</u>** The development of a powdered material at the surface of hardened concrete.
- A.2.13. <u>EFFLORESCENCE</u> -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. <u>EXFOLIATION</u> 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.</u>
- A.2.19. <u>PEELING</u> 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. <u>**POPOUT**</u> 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. <u>POPOUTS, SMALL</u> Popouts leaving holes up to 10 mm in diameter, or the equivalent.
- A.2.20.2. <u>POPOUTS, MEDIUM</u> Popouts leaving holes between 10 and 50 mm in diameter, or the equivalent.
- A2.20.3. <u>POPOUTS, LARGE</u> 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. <u>SCALING</u> 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. <u>SCALING, LIGHT</u> Loss of surface mortar without exposure of coarse aggregate.
- A.2.21.2. <u>SCALING, MEDIUM</u> 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. <u>SPALL</u> 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. <u>SMALL SPALL</u> A roughly circular depression not greater than 20 mm in depth or 50 mm in any dimension.

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- A.2.22.2. <u>LARGE SPALL</u> 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. <u>WARPING</u> 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.

ER-AA-335-018 Revision 5 Page 26 of 32

# 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. **BUGHOLES** 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.

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- A.3.6. <u>HONEYCOMB</u> 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. <u>JOINT</u> 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. <u>LAITANCE</u> 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. <u>SEGREGATION</u> The differential concentration of the components of mixed concrete, aggregate, or the like, results in non-uniform proportions in the mass.

ER-AA-335-018 Revision 5 Page 27 of 32

# 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 <u>WATER VOID</u> Void along the underside of an aggregate particle or reinforcing steel which formed during the bleeding period; initially filled with bleed water.

ER-AA-335-018 Revision 5 Page 28 of 32

# ATTACHMENT 2 Definitions of Coating Failures Page 1 of 1

- B.1. <u>DISCOLORATION</u> 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. <u>CHALKING</u> 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. <u>CRACKING (COATING)</u> 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. UNDERCUTTING 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. <u>MEDIUM RUST</u> A degree of in the form of iron oxide formation on steel, where less than 5% of the base metal is lost.
- B.12. <u>MAJOR RUST</u> A degree of in the form of iron oxide formation on steel, where more than 5% of the base metal is lost.

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ER-AA-335-018 Revision 5 Page 29 of 32

# 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. <u>BROKEN WIRE</u> -- 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. <u>EXCESSIVE SHIM GAPS</u> -- Shims that have slipped out of position leaving gaps in excess of construction tolerances between the halves.
  - C.6. <u>UNEVEN SHIM STACK</u> -- 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

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ER-AA-335-018 Revision 5 Page 31 of 32

# 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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Station:       Unit:       Date:       Report No:         WO No(s):       Tendon Anchorage No:       Tendon End:       Shop       Field         Location:       Tunnel, Gallery, Buttress:       Elevation:       Bearing Plate I.D.:         Bearing Plate I.D.       Anchor Head I.D.       Bushing I.D.         Exam Type:       DV       VT-1       Type Of Exam.       Direct       IRemote         Besign Drawing(s)       Visual Alds:       Of Test Card       UTC or Serial No.       Cal. Due Date:       Imm:         Special / Specific Instructions:       Component / Item Number and Description       RESULTS       Explanation / Notes         Component / Item Number and Description       NI       RI TYPE       IO       (Sketch Shall Be Attached Depicting Location Of All Missing, Protructing, Unseated Wires)         Results Legend:       NI - No Indications       Recordable Indication       IO - Information Only         Results Legend:       NI - No Indications       RI - Recordable Indication       O. Other (Explain)         B       Missing Wires       H.       Cracks       O. Other (Explain)         C       Protructing / Unseated Wires       J. Nicks, Gouges, Mechanical Damage       O. Other (Explain)         B       Missing Wires       K.       Uneven Shin Stack       Excessive			¥		and the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of th					
Location:       Tunnel, Gallery, Buttress:       Elevation:       Bearing Plate I.D.         Bearing Plate I.D.       Anchor Head I.D.       Bushing I.D.         Exam Type:       DV       UT-1       Type Of Exam:       Direct       Remote         As Found Exam       As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned         Design Drawing(s)       Visual Aids:       Cal. Due Date:       Time:         Special / Specific Instructions:       Test Card       Ot C or Serial No.       Cal. Due Date:       Time:         Special / Specific Instructions:       Component / Item Number and Description       NI       RESULTS       Explanation / Notes         Component / Item Number and Description       NI       RITYPE       IO       (Sketch Shall Be Attached Depicting Location Of All Missing, Protructing, Unseated Wires)         Results Legend:       NI - No Indications       RI - Recordable Indication       IO - Information Only       ID         Results Legend:       NI - No Indications       RI - Recordable Indication       IO - Information Only       ID         Results Legend:       NI - No Indications       RI - Recordable Indication       ID - Information Only       ID         Recordable Indication       Ni - No Indications       RI - Recordable Indication       IO - Information Only       ID	Station: Unit:		Date:			F	Report No:			
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Exam Type:       DV       Type Of Exam::       Direct       Remote         Das Found Exam       As Left Exam Following Retensioning Of Tendors Which Have Been Detentioned         Design Drawing(s)       Visual Aids:         M&TE Used:       Test Card       UTC or Serial No.       Cal. Due Date:         Illumination Used       Illumination Verified:       Date:       Time:         Special / Specific Instructions:       Explanation / Notes       Explanation / Notes         Component / Item Number and Description       RESULTS       Explanation / Notes         Component / Item Number and Description       RESULTS       Explanation / Notes         Results Legend:       NI - No Indications       RI - Recordable Indication       10 - Information Only         Results Legend:       NI - No Indications       RI - Recordable Indication       0.       Other (Explain)         B       Missing Wires       H. Cracks       O. Other (Explain)       Explanation / Netes         C       Portuling / Unseated Wires       J. Nicks, Gouges, Mechanical Damage       O. Other (Explain)         B       Nissing Buton Heads       I. Pitting       O. Other (Explain)         C       Portuling / Unseated Wires       J. Nicks, Gouges, Mechanical Damage       Surface Demange         C       Broken Wires	Location: Tunnel, Gallery, Buttre	SS:			Elevation:		Bearing Plate	I.D.:		
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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 :       IYes       No       Sketch       Photo       Video       Other (Describe):         Results: Acceptable         Version       LEVEL       DATE         This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition.         Rior Unacceptable results Acceptable       Yes       No         Additional Actions:       (Adion Request, Work Order, Issue Report, etc. initiated for Corrective Action)       DATE:         LEVEL III or RI REVIEW (as applicable)       DATE:							(	O. Othe	er (Expl	ain)
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       No       Sketch       Photo       Video       Other (Describe):         Results: Acceptable       Yes       No         EXAMINER/EVALUATOR         (Print & Sign)										
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F.       Other Corrosion       M.       Gasket Seating Surface Damage         G.       Evidence Of Free Water (Quantify)       N.       Surface Discontinuities, Deflections.         Supplemental Information :       Yes       No       Sketch       Photo       Video       Other (Describe):         Results: Acceptable         Yes       No       LEVEL       DATE         DATE         StAMINER/EVALUATOR         (Print & Sign)										
G.       Evidence Of Free Water (Quantify)       N.       Surface Discontinuities, Deflections.         Supplemental Information :       Yes       No       Other (Describe):         Results: Acceptable         Yes       No         EXAMINER/EVALUATOR       LEVEL       DATE         (Print & Sign)       DATE         STATION/ADMIN REVIEW         (Print & Sign)       DATE         This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition.         Rlor Unacceptable results Acceptable       Yes       No         Additional Actions:       (Adion Request, Work Order, Issue Report, etc. initiated for Corrective Action)       DATE:         LEVEL III or RI REVIEW (as applicable)       DATE:       DATE:							ne			
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Page ____ of ____

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ER-AA-335-018 **Revision 5** 

Page 32 of 32

# **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

				raye i u			
Station:	Unit:			Date:		Rep	port No:
System:	Component:					WC	No(s).:
Location:	Building:	Elev.:	:	С	ol.;	Row:	Azimuth/Radius:
Exam Type			-3C	Type Of	Exar	n: Direct Remot	e Matl. Type:
Design Drav				Visual Ai		in the second second second second second second second second second second second second second second second	
Surface:	ID OD			waaaaaa haaaaa ahaa ahaa ahaa ahaa ahaa		nponents Coated:	YES NO
M&TE Used		Test Ca	ard	UTC or S			Cal. Due Date:
Illumination						on Verified: Date:	Time:
	ecific Instructions:						
	nent / Item Number ar	nd		RESULTS		Expla	nation / Notes
	Description		NI	<b>RI TYPE</b>	10	(As a minimum, Record	
(€	.g. EIN, EID, etc.)					<b>Recordable Indications</b>	
				Results			
	NI - NO	Indications		ordable Indica		lication IO – Information C	
<ul> <li>B. Exposed</li> <li>C. Exposed</li> <li>D. Evidence</li> <li>E. Evidence</li> <li>F. Leaching</li> </ul>	Characterize and Size) Reinforcing Steel Metallic Items (Other) Of Grease Leakage Of Moisture Or Chemical Attack I Information : Yes	G. S H. □ J. P J. S K. C L. C	Settle Degra Popor Spalls Cold . Corro	ments Or Def aded Patches uts , Voids, Ho	lection or Re oneyc	pairs M. Scaling pairs N. Coating omb O. Abrasic P. Air Voic Q. Efflores	Explain )
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TM-N1043-500 Appendix E Revision 0, Page 114 of 124

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RB Tendon End Cap Installation         Applicability/Scope       USAGE LEVEL       Effective Date         TMI DMision       2       OCT         This document is within QA plan scope       X       Yes       No         Safety Reviews Required       X       Yes       No         List of Effective Pages       Page       Revision       Page         1       7       7       7       7         3       7       7       7       7	7 ata 4 2000
Applicability/Scope     USAGE LEVEL     Effective Date       TMI DMiston     2     0CT       This document is within QA plan scope     X     Yes     No       Safety Reviews Required     X     Yes     No       List of Effective Pages       Page     Revision     Page       1     7       3     7	ata 4 2000
TMI DMsion     2     0CT       This document is within QA plan scope     X     Yes     No       Safety Reviews Required     X     Yes     No       List of Effective Pages       Page     Revision     Page     Revision     Page       1     7       2     7       3     7	4 2000
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Originator T. M. Hawkins J. M. Hawkins 10/02/01	0
Procedure Owner /s/ R. M. Pierce 09/21/00	
PRG /s/ H. K. Olive for J. S. Schork 10/02/00	
Approver /s/ D. W. Ethnidge 09/25/00	

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<i>·</i> .		TMI - Unit 1 Corrective Maintenance: Procedure	1410-Y-83	
)	Title	1	Revision No.	- (
	<b>RB</b> Tendon End Cap Instal	lation	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 <u>REFERENCES</u>

- 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 valve 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.

			Number
		TMI - Unit 1 Corrective Maintenance Procedure	1410-Y-83
}	Title		Revision No.
	<b>RB Tendon End Cap Installation</b>	7	

- 5.8 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.
- 8.3 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 met 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 65 gallon drum.
  - 7.4.4 Thermometer (calibrated) to measure replacement grease temperature 0-300°F).
  - 7.4.5 Viscosity Oil 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 pilobond 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.

# TM-N1043-500 Appendix E Revision 0, Page 117 of 124

			-	Number
			TMI - Unit 1 Corrective Maintenance Procedure	1410-Y-83 Revision No.
			74 - 49	
RB Tend	don End (	cap Insta	liation	7
7.	9 Modif studs	ied 1 1/18" on original	socket sets with body approximately 3" long in order type end cap hold-down configuration.	r to clear end cap hold-down
7.	10 Clean	ing rags.		
7.	11 Tende	on End Cap	fasteners, gaskets, and clamps.	
	7.11.1	l Top (S	hop End), Vertical End Cap Materials:	
		, <b>e</b>	Flat Under-Can Gaskets, 1 per end cap, SS # Ryerson Drawing No. 170WAC5) - 1/2 inch thi 17 1/2" O.D. (+1/16, -0) x 14 1/2" I.D. (+0, -1/1 Corp. or equal.	ck, closed cell neoprene,
		•	Stud Gaskets, 4 per end cap, SS# 929-031-30 3/8" O.D. x 5/8" I.D. Manufacturer - J.D. Rohr equal.	
		•	Belleville Spring Washers, 4 per end cap, SS# 5/8° standard, Manufacturer - Rolex Co. Hillski	
	7.11.2	2 Bottom	n (Field End), Vertical End Cap Materials:	
	·	•	O-Ring Gaskets, 1 per end cap SS# 459-048-1 17 1/4" I.D., 60 - 80 durometer neoprene.	7500-1. 5/8" cross-section,
	7.11.3	B Hoop a	and Dome Tendon End Cap Materials:	
		•	Flat Under-Cap Gaskets, 1 per end cap, SS#2 Ryerson Drawing No. 170WAC5) - 1/2 inch thi 17 1/2" O.D. (+1/16, -0) x 14 1/2" I.D. (+0, -1/1 Corp. or equal.	ck, closed cell neoprene,
		•	End Cap Pipe Plugs, 4 per end cap, 1/2" NPT	Galvanized.
		٠	End Cap Pipe Plugs, 1 per end cap, 1/4" NPT	Gaivanized.
		٠	Hold-Down Clamps, 4 per end cap, (Ref. P.O. Precision Surveillance or equal.	0438005), Manufacturer -
	-	•	Hold-Down Bolts and Washers, 4 per end cap Galvanized.	. 1° - 8UNC x.2 1/2"
		•	POP-A-PLUG, P/N PSC-0750-S, SSN 000-47	8-0820-1
		•	POP-A-PLUG Installation Tool	
		•	Tefion 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

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- 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^e from the flange and in line with the fill plug, drill and tap for a 1/4^e 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.

		ľ		Number
			TMI - Unit 1 Corrective Maintenance Procedure	1410-Y-83
Title				Revision No.
RB Ten	don End Ca	p installa	ation	7
	8.3.9		eady done, the four hold down stud holes are to be p This method of plugging is with Pop-a-plugs, howe ed.	
		8.3.9.1	Prior to installing a Pop-a-Plug, ensure that the l gouges or scoring that would affect its ability to e	
	•	8.3.9.2	Install the Pop-a-Plug in accordance with the ma Use <u>no</u> pipe sealant.	nufacturer's instructions.
		8.3.9,3	if unable to install a Pop-a-Plug, tap the hole to a Pipe plug. Apply tefion tape and install the plug.	
8.	4 Installat	ion of replac	cement Rubatex Gasket configuration for hoop and	dome tendons.
	8.4.1	Bond the	Rubatex gasket to the face of the flange using pilot	oond.
	8.4.2		tendon end cap over the anchorage against the bea g or misaligning the gasket which has been glued to	
	8.4.3		our tendon end cap hold down clamps with bolts and I hand tighten them.	i washers to the bearing plate
	8.4.4		that the gasket has not slipped or become crimped down clamps are aligned property.	and that the tendon end cap
	8.4.5		each boit, equalizing the load on each as much as p tex main gasket by approximately 1/8". (No torquin	
	8.4.6		ase to 140°F to 200°F using a calibrated thermomet Data Sheet 1.	er to obtain temperature and
	8.4.7	the tendo until it rea	ontal and dome tendons, attach a vendor supplied ) in end cap and hand pump hot grease (140°F - 200 aches a level 1 1/2" to 2" below the vent hole to allow Record grease level on Data Sheet 1	°F) into the tendon end cap
	8.4.8		on tape to the grease inlet and vent plug threads an ent plug and tighten them securely using an approv	
	8.4.9	Verify tha	t no grease is leaking. If leakage does exist, correc	t the deficiency.
	8.4.10	Record a	mount of grease added on Data Sheet 1.	
8.	5 installat	ion of Rubat	tex gasket with top (shop end) vertical "through-can	" bolting.
	8.5.1	Bond the	Rubatex gasket to the face of the flange using Pilol	bond.
	8.5.2		tendon end cap over the anchorage against the bea y or misaligning the gasket which has been glued to	

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14.	Title			TMI - Unit 1 Corrective Maintenance Procedure	1410-Y-83 Revision No.
	RB Tendo	n End C	ap Install	ation	7
		8.5.3		e four tendon and cap hold down nuts (with gaskets d hand tighten them:	and conical washers) on the
	·	8.5.4		that the gasket has not slipped or become crimped by aligned.	and that the tendon end cap
		8.5.5		each nut, equalizing the load on each stud as much a s the Rubatex main gasket by approximately 1/8". (I	
		. [***		NOTE	
			o not overfill p of can.	if topping off with grease. Maintain $2^n$ to $3^n$ of air ga	p below
		8.5.6	Refill the	tendon end cap as follows:	
	,	•	1.	Heat grease to 140°F to 200°F using a calibrated temperature and record on Data Sheet 1.	thermometer to obtain
			<b>2.</b> ·	Attach a vendor supplied Y-device to the grease and hand pump hot grease (140°F to 200°F) into reaches a level 2" to 3" below the vent hole to all grease. Record grease level on Data Sheet 1.	the tendon end cap until it
			3.	Apply teflon tape to the grease inlet and vent plug grease inlet plug and the vent plug and lighten th approved thread sealant.	
			4.	Verify that no grease is leaking and record it on E does exist, correct the deficiency.	Data Sheet 1. If leakage
			5.	Record amount of grease added on Data Sheet 1	
	8,6	installa	tion of O-Rir	ng gaskets on lower vertical tendons with bearing pla	te bolting
		8.6.1	Bond the	O-Ring gasket in place using Pliobond.	
		8.6.2		tendon end cap over the anchorage against the bea g or misaligning the O-ring which has been glued to t	
		8.6.3	Install the	four tendon end cap hold down bolts and hand tigh	ien thêm.
		8.6.4	compress bearing p additiona	each boit, equalizing the load on each bolt as much a s the O-ring main gasket. The flange should be pulle late. Bring the bolts to a "snug-tight"* condition and I 1/4 to 1/3 tum of the bolt head. (""Snug-tight" is de by the full effort of a person using an ordinary spud w	d up tight against the then tighten the bolts by an fined as the tightness

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	TMI - Unit 1 Corrective Maintenance Procedure	1410-Y-83 Revision No.	
•	RB Tendon End Cap Installation	77	
	8 6 5 It is required to refill the tendon duct which from the lower w	enticel tendon and when most of	

- 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

- 9.1 No grease leakage from the tendon end cap.
- 9.2 End cap vertiled 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.
- 9.4 .eet 1 (Attachment 1) is completed for each end cap that has had a grease change and is availed 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 ATTAL 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"

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# ATTACHMENT 1 Data Sheet 1

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1410-	Y-83
Revis	lon 7
Page	1 of 1

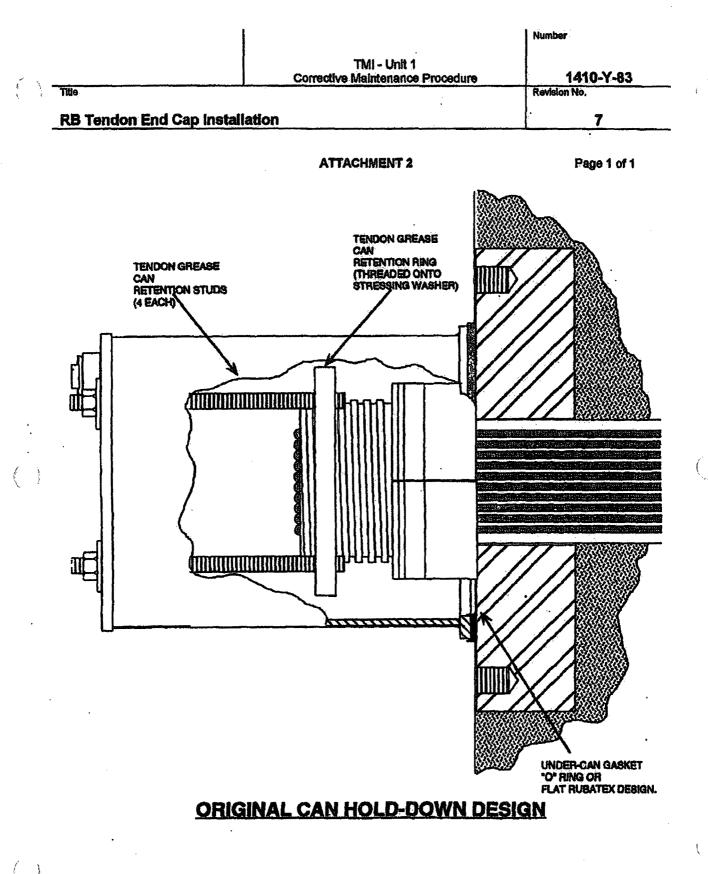
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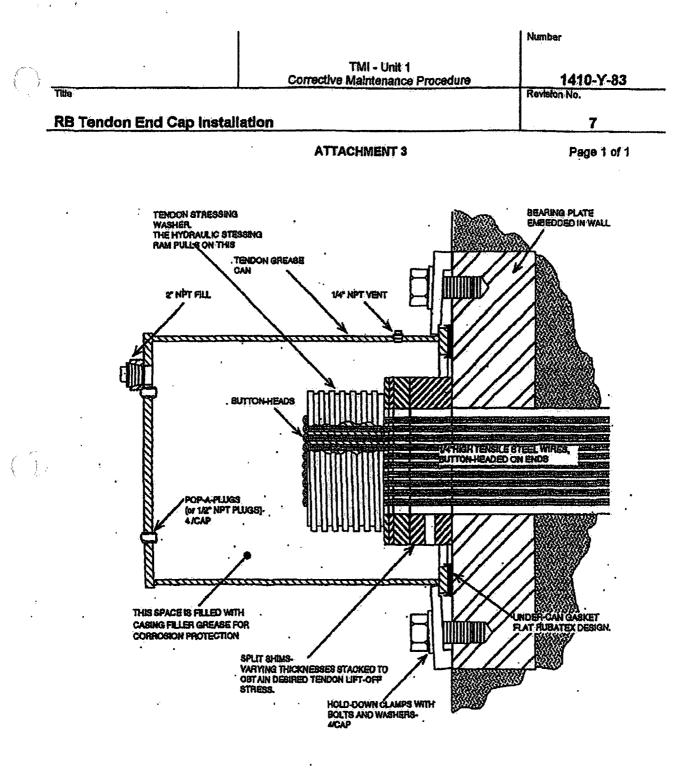
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8.1       Tendon Identity:			•	Regreasing of R	B Tendon End Caps		
8.4 Hoop and Dome Tendons         8.4.6 Replacement grease temperature:		8.1	Tendon Identity:		Tendon End:		
8.4.5       Replacement grease temperature:		8.3,2	Amount of grease removed:		gallons		
8.4.7       Grease level below vent hole		8.4 Hoop and Dome Tendons					
8.4.9       Grease leakingYes		8.4.6	Replacement grease tempe	rature:	°F (140°F to 200°F)		
8.4.9       Amount of grease added	•	8.4.7	Grease level below vent hol	θ	inches (11% to 2")		
8.6 Top Vertical Tendons         8.5.6(1) Replacement grease temperature		8.4.9	. Grease leaking	Yes	No		
8.5.6(1) Replacement grease temperature		8.4.9	Amount of grease added		gallons		
8.5.6(2) Grease level below vent hole				8.6 Top Ve	rtical Tendons		
8.5.6(4) Grease leakingYesNo         8.5.6(5) Amount of grease addedgalions         8.6.5 Replacement grease temperature°F (140°F to 200°F)         8.6.5 Grease leakingYesNo         8.6.7 Amount of grease addedgalions         10.0 PMT Sat         Comments:		8.5.6(1	I) Replacement grease tempe	rature	°F (140°F to 200°F)		
8.5.8(5) Amount of grease addedgalions         8.6.5       Replacement grease temperature°F (140°F to 200°F)         8.6.6       Grease leakingYesNo         8.6.7       Amount of grease addedgalions         10.0       PMT SatUnsat         Comments:		8.5,6(2	2) Grease level below vent hol	θ	inches (2" to 3")		
8.8 Lower Vertical Tendons         9       8.8.5       Replacement grease temperature		8.5.6(4	1) Grease leaking	Yes	No		
8.8.5       Replacement grease temperature		8.5.6(	5) Amount of grease added	• · · · · · · · · · · · · · · · · · · ·	galions		
8.8.8 Grease leakingYesNo   8.8.7 Amount of grease addedgalions   10.0 PMT SatUnsat   Comments:				8.6 Lower V	ertical Tendons		
8.6.7 Amount of grease addedgalions         10.0 PMT Sat         Comments:         Comments:	Q	8.6.5	Replacement grease tempe	rature	°F (140°F to 200°F)		
10.0       PMT Sat		8.6.6	Grease leaking	Yes	No		
Comments:		8.6.7	Amount of grease added		gallons		
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TM-N1043-500 Appendix F Revision 0 Page 1 of 14

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Project: TMI NUCLE	AR PLANT UNIT 1 – 35 th Year	ol	bb #N1043
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DATE CHECKED	8-11-09	MASTER GAUGE (PSI)	JACK GAUGE (PSI)
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REMARKS		3000	2986
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Project: TMI NUCLE	AR PLANT UNIT 1 – 35 th Year	Jol	o # <u>N1043</u>
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TM-N1043-500 Appendix F Revision 0,Page 3 of 14

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Project: TMI NUCLE	AR PLANT UNIT 1 – 35 th Year	jc	ob#N1043
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REMARKS	NUNE.	3000 4000 5000 6000	2987 3993 5003 5994
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Project: TMI NUCLEA	R PLANT UNIT 1 – 35 ^{ih} Year	Jol	b#N1043
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TM-N1043-500 Appendix F Revision 0,Page 4 of 14

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Project: TMI NUCLE	AR PLANT UNIT 1 – 35 th Year		Job #
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DATE CHECKED	8-17-09	MASTER GAUGE (PSI)	JACK GAUGE (PSI)
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REMARKS	44084	3000	2990
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Project: TMI NUCLE	AR PLANT UNIT 1 – 35 th Year	ل	ob#N1043
	GAUGE CALIBRATION	VERIFICATION RECORD	
		,	
DATE CHECKED	8-17-09	MASTER GAUGE (PSI)	JACK GAUGE (PSI)
GAUGE I.D.	1017879	1000	988
MASTER GAUGE I.D.	44084	2000	1985
REMARKS	None	3000	2983
		4000	3985
		5000	4989
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TM-N1043-500 Appendix F Revision 0, Page 5 of 14 **PSC PROCEDURE QA 10.1 GAUGE CALIBRATION RECORD FORM** July 31, 2009 Page of Revision 0 Project: TMI NUCLEAR PLANT UNIT 1 – 35th Year Job # N1043 GAUGE CALIBRATION VERIFICATION RECORD 8-18-09 MASTER GAUGE (PSI) JACK GAUGE (PSI) DATE CHECKED 1015756 1000 990 GAUGE I.D. 44084 19.89 MASTER GAUGE I.D. 2000 REMARKS 3000 2988 None 3991 4000 4999 5000 5995 6000 7000 6986 ( Att QC SIGN OFF Project: TMI NUCLEAR PLANT UNIT 1 – 35th Year Job # N1043 GAUGE CALIBRATION VERIFICATION RECORD 8-18-09 MASTER GAUGE (PSI) JACK GAUGE (PSI) DATE CHECKED 1017819 992 1000 GAUGE I.D. 1983 440849 2000 MASTER GAUGE I.D. 2983 REMARKS 3000 None 4000 3989 5000 4991 6000 5989 1000 6983 June C. Sata QC SIGN OFF

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TM-N1043-500 Appendix F Revision 0,Page 6 of 14

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Project: TMI NUCLE	EAR PLANT UNIT 1 – 35 th Year	J	ob#N1043
	GAUGE CALIBRATION	VERIFICATION RECORD	
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DATE CHECKED	8-19-09	MASTER GAUGE (PSI)	JACK GAUGE (PSI)
GAUGE I.D.	1015756	1000	992
MASTER GAUGE I.D.	44084	2000	1984
REMARKS	NONR	3000	2988
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Project: TMI NUCLE	AR PLANT UNIT 1 – 35 th Year	Ja	b#N1043
	GAUGE CALIBRATION	VERIFICATION RECORD	
	8-20-19		
DATE CHECKED	8-20-09	MASTER GAUGE (PSI) ノクタウ	JACK GAUGE (PSI)
GAUGE I.D.	1015756	<u></u>	99/
MASTER GAUGE I.D. REMARKS	44084	2000	1989
REWARKS	None	3000	2997
		4000	3994
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TM-N1043-500 Appendix F Revision 0.Page 7 of 14

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TM-N1043-500 Appendix F Revision 0.Page 8 of 14

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Project: TMI NUCL	EAR PLANT UNIT 1 – 35 th Year	J.	ob # N1043
	GAUGE CALIBRATION	N VERIFICATION RECORD	
DATE CHECKED	0-21-09	MASTER GAUGE (PSI)	JACK GAUGE (PSI)
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43 QA 10.1 TM.09 ISI.doc

TM-N1043-500 Appendix F Revision 0, Page 9 of 14 **PSC PROCEDURE QA 10.1 GAUGE CALIBRATION RECORD FORM** July 31, 2009 Page ____ of ____ Revision 0 Project: TMI NUCLEAR PLANT UNIT 1 – 35th Year Job # N1043 GAUGE CALIBRATION VERIFICATION RECORD 8-28-09 MASTER GAUGE (PSI) JACK GAUGE (PSI) DATE CHECKED 1015756 44084 989 GAUGE I.D. 1000 1991 MASTER GAUGE I.D. 2000 2990 REMARKS None 3030 3998 4000 5004 5000 5997 6000 6981 2000 & C. Ort QC SIGN OFF TMI NUCLEAR PLANT UNIT 1 – 35th Year Job # N1043 Project: **GAUGE CALIBRATION VERIFICATION RECORD** MASTER GAUGE (PSI) JACK GAUGE (PSI) DATE CHECKED GAUGE I.D. MASTER GAUGE I.D. REMARKS QC SIGN OFF

43 QA 10.1 TM.09 ISI.doc

TM-N1043-500 Appendix F Revision 0,Page 10 of 14

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Project:TMI_NUCLEA	AR PLANT UNIT 1 – 35 th Year	ol	b#N1043
	GAUGE CALIBRAT	ION VERIFICATION RECORD	
DATE CHECKED	11-11-09	MASTER GAUGE (PSI)	JACK GAUGE (PSI)
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GAUGE I.D.	00107225	1000	1000
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TM-N1043-500 Appendix F Revision 0,Page 11 of 14

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TM-N1043-500 Appendix F Revision 0,Page 13 of 14

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Project: TMI NUCLEAR F DATE CHECKED GAUGE I.D. MASTER GAUGE I.D.	PLANT UNIT 1 – 35 th Year GAUGE CALIBRATIC //~//6~09 	Job DN VERIFICATION RECORD MASTER GAUGE (PSI)	0 # <u>N1043</u> JACK GAUGE (PSI) <i>JODD</i> 3000
Project: TMI NUCLEAR F DATE CHECKED GAUGE I.D. MASTER GAUGE I.D.	PLANT UNIT 1 – 35 th Year GAUGE CALIBRATIC //-/4-09 dc/07223	Job DN VERIFICATION RECORD MASTER GAUGE (PSI) 1000 2000 3000	0 # <u>N1043</u> JACK GAUGE (PSI) <i>JODD</i> 3000 -3000
Project: TMI NUCLEAR F DATE CHECKED GAUGE I.D. MASTER GAUGE I.D.	PLANT UNIT 1 – 35 th Year GAUGE CALIBRATIC //~//6~09 	Jot DN VERIFICATION RECORD MASTER GAUGE (PSI) 1000 3000 3000 4000	D #N1043 JACK GAUGE (PSI) 
Project: TMI NUCLEAR F DATE CHECKED GAUGE I.D. MASTER GAUGE I.D.	PLANT UNIT 1 – 35 th Year GAUGE CALIBRATIC //~//6~09 	Job DN VERIFICATION RECORD MASTER GAUGE (PSI) 1000 3000 3000 4000 5000	0 # N1043 JACK GAUGE (PSI) 1000 3000 3000 4000 5000
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TM-N1043-500 Appendix F Revision 0,Page 14 of 14

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Project: <u>TMI NUCLEAF</u>	R PLANT UNIT 1 – 35 ⁱⁿ Year GAUGE CALIBRATION 11–17–09 CC107225	Job I VERIFICATION RECORD MASTER GAUGE (PSI)	# <u>N1043</u>
Project: <u>TMI NUCLEAF</u> DATE CHECKED GAUGE I.D.	R PLANT UNIT 1 – 35 ⁱⁿ Year GAUGE CALIBRATION	Job I VERIFICATION RECORD MASTER GAUGE (PSI)	# <u>N1043</u> JACK GAUGE (PSI)
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Project: TMI NUCLEAF DATE CHECKED GAUGE I.D. MASTER GAUGE I.D.	R PLANT UNIT 1 – 35 th Year GAUGE CALIBRATION 11–17–09 CC107225 1015756	Job I VERIFICATION RECORD MASTER GAUGE (PSI) 1000 2000 3000 3000	# <u>N1043</u> JACK GAUGE (PSI) 
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To: R. O. Barley From: H. T. Hill Date: 20 Aug 09

Subject: Replacement of Surveillance Tendon Corrosion Protection Medium

Copy: R. Robbins (PSC)

Paragraph 8.2.4 of the tendon surveillance procedure, 1301-9.1, requires that corrosion protection medium (CPM or, grease) be replaced within 30 days of removing an end cap but provides an exception, applicable only to the 2009 surveillance, which allows the Responsible Engineer (RE) to extend the 30 day interval.

SGT ECR TM 06-00816, Revision 1 (issue pending) will set a limit of 6 months between de-tensioning a tendon to support creation of the SGR opening and replacement of CPM. The basis for the extend interval is a technical opinion given by the pre-stressing system services contractor, PSC. This opinion and supporting information are documented in a 6 Jun 08 letter from Paul Smith of PSC to Ronald Dufresne of SGT. A copy of this letter is attached.

For practical reasons, primarily relating to safety and cost concerns, it is advantageous to replace CPM in the ducts of surveillance tendons V11, V90, D122 and D322 when this work is done for the tendons included in the SGR project scope, an activity that will occur more than 30 days after removal of surveillance tendon end caps. To accommodate this schedule, the 30 day interval specified in 1301-9.1 will be extended to 6 months as recommended in the PSC letter.

This memorandum documents authorization by the undersigned RE to set the interval at 6 months for the reasons and with the technical justification discussed above. A copy of this memorandum will be appended to the 35th Year Surveillance record copy of Procedure 1301-9.1.

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Howard T. Hill, P. E. IWL Responsible Engineer

# 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



June 6, 2008

SGT LTD. Three Mile Island SGR Middleton, PA

Attention: Ronald Dufresne

Dear Ron:

PSC has reviewed your request as to the length of time a tendon at Three Mile Island may be drained and left unfilled. The Viscosity grease is design to adhere to the wires up to temperature of 145 degree Fahrenheit. This allows for grease coverage to remain on the wire after bulk draining of tendons. This will provide projection for over a year if void is sealed. PSC has observed scrap tendons maintaining the grease coating for over two year exposed to the weather without corrosion occurring under the grease. The original requirement for a shop greased tendon was 90 days from place to stress and 30 days from stress to grease. (Allowing 120 days without grease) There were studies completed by the industry that set the partially drained tendon acceptable time before regreasing at one year. The studies were not published, but several plants adopted the one year window. (Byron & Braidwood, ANO)

Therefore, we recommend a six month window be allowed for tendons to be partially greased with protection from weather. (ie. Top caps on)

Sincerely,

Paul C. Smith

Paul C. Smith President To: R. O. Barley From: H. T. Hill Date: 18 Aug 09 Copy: P. Smith (PSC), J. Estep (PSC), D. McCurdy (Shaw)

Subject: Vertical Tendon Lower End Cap Gasket Replacement

Vertical tendon lower end caps have been examined for corrosion protection medium leakage. The following were identified for gasket replacement during the SGR outage.

V10 (close to gallery entrance)
V60
V62
V71 (close to floor drain)
V88
V98 (directly over floor drain)
V99 (directly over floor drain)

Bases for selecting the listed caps are:

- Excessive leakage
- Proximity of a leaking end cap to a floor drain
- Proximity of a leaking end cap to the tendon gallery entrance

Recommend that end cap gasket replacement commence immediately upon completion of the non-outage surveillance scope to minimize overlap with STG work in the gallery.

H. T. Hill IWL Responsible Engineer

#### TM-N1043-500 Appendix G Revison 0, Page 4 of 6

			TMI - Unit 1 veillance Procedure	Number
`}	Title	Sur	1301-9.1 Revision No.	
	<b>RB Structural Integrity Tend</b>	on Surveillan	20	
		Page 1 of A C		
	Re			
	Procedure Number / Title	Revision	Reviewed/Accepted by	Date
	MANUAL CONTROL COLICY	/	- TOB 17/160	05 AUG 09
	DEFINITIONS	0	7803 176760	2
	PS1.0		103 17676	
	SQ1.0		- 19B 17696	p
	502.0*		70B 11676	2
	503.0		VOB 12626	,
	50.4.0	0	40B 17016	·
,	5Q5,0		TOB 12626	
)	50.6.0	0	100B 12676	
	5@ 6.1		TOB 176760	
	5062		12676- 12676	
	5027.0		1266 12676	
	SQ 7.1	_0	TOB 1790	
•	5029.1		JOB 12646	
	5010.2	0	TDB 12626	· · · · · · · · · · · · · · · · · · ·
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	502 12.1		JAB 1:7676	·
	5012.2	`	14B 176762	05 AUG 09

'ACCEPTED WITH THE FOLLOWING EXCEPTION: PSC TO COMPLETE 'END' COLUMN IN TABLE 2-1. 43

TOB R.O. BARLEY TET HOWARD T. HILL

# TM-N1043-500 Appendix G Revison 0, Page 5 of 6

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<b>RB Structural Integrity Tend</b>	on Surveilland	e	20
	·DA1	A SHEET 13	Page X of X 2 2
Re	view / Acceptanc	e of Contractor Procedures	
Procedure Number / Title	Revision	Reviewed/Accepted by	Date
QA 1.0		-10B 1246	2 05 AUG 09
QA 2.0		10 <u>B / 16</u> E	2
QA3.0	. 0	10B 1796	~
RA 4.0	0	T203 1 26	
QPA 4.1		10B 1756	
QA 5.0		1013 17616	b'
QA 6.0		195 1746	
QA 7.0		<u> 100</u> 1 7696	
QA 8.0		100 12676	
QA 8.1	. 0	1903 1 2676	
QA9.0		1903 / 7676	
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# TM-N1043-500 Appendix G Revison 0, Page 6 of 6

		Number
	TMI - Unit 1 Surveillance Procedure	1301-9.1
litle		Revision No.
RB Structural Integrity Tendon S	Surveillance	20
	DATA SHEET 12	Page 1 of 1
זע	-1C / VT-3C Examiner Qualification	
Name of Examiner	Employer	
W. RANCE ROBBINS	PSC	
TIMOTHY C. GIBSON	<u>PSC</u>	
	·	
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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 VT-1C / VT-3C 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:** 

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Name	HOWARD_	T. HILL	
Registration (	CALIFORNIA	<u>C22265</u>	
Signature	State	License No.	Expiration
/	1		

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Table I: Three Mile Isla	സരിം	- Containm	ent (	Concrete VT-1C or VT-9C Visual Examination
COMPONENT / ITEM		RESULTS		
NUMBER AND DESCRIPTION	NI	<b>RI TYPE</b>	10	COMMENTS
			Α	As previously reported, no cracks > than 0.015" on base mat.
			Q	Efflorescence on inner and outer walls where they meet the base mat. No change.
			С,Н	plates and inner wall with active corrosion.
			с	Exposed metal item between V-4 and V-5, 2" long x 1/2" wide with active corrosion. Exposed metal item between V-5 and V-6 3" long x 1/2" wide with active corrosion.
			Е	Evidence of moisture on outer wall between V-80 and V-90 with efflorescence, and stalactites forming.
TENDON GALLERY BASE MAT			С	Exposed embed plate adjacent to outer wall from V-99 to V-113 has active corrosion on surface with pitting < than 0.010" deep.
			н	Degraded area of grout/concrete at outer edge of V-50 bearing plate. We removed loose material and recorded measurements $4.5^{\circ}$ long x 0.75° wide and 0.4° deep. Outer edge of bearing plate has surface rust with no pitting.
		L,N		V-84 grease cap flange coating is deteriorated surface has active corrosion. VT-1 will be performed.
			н	Degraded grout patch on rough finished concrete area between V-77 and V-78 also adjacent to outer edge of V-77. Outer edge of exposed bearing plate on V-77 has active corrosion. A VT-1 will be performed.
			N	Concrete surface coated with sealant are peeling in areas throughout gallery.
TENDON GALLERY BASE MAT AREA ADJACENT TO V-89 FIELD END			в	Previously reported exposed rebar adjacent to V-89 tendon, no change.
TENDON GALLERY BASE MAT AREA ADJACENT TO V-143 FIELD END			в	Exposed rebar, previously reported, adjacent to V-143, no change.
TENDON GALLERY BASE MAT AREA ADJACENT TO V-149 FIELD END			В	Exposed rebar, previously reported, adjacent to V-149, no change.
V-77 BEARING PLATE			Е	Active corrosion on outer edges of the bearing plate < than 0.010" deep.
FIELD END				Note: Inspection of the bearing plate limited to outer edges due to the grease cap being bolted in place.
			Е	Active corrosion on outer half of the grease flange with pitting < than 0.040" deep.
V-84 BEARING PLATE AND GREASE CAP FIELD END			Е	Active corrosion on the outer corner of the bearing plate < than 0.010" deep.
				Note: Bearing plate inspection limited to outer edges due to grease cap being bolted in place.

A. Cracks (Characterize and Size)
B. Exposed Reinforcing Steel
C. Exposed Metallic Items (Other)
D. Evidence of Grease Leakage
E. Evidence of Metallic G.

- Settlements of Deflections
- Degraded Patches or Repairs Popouts, Voids, Honeycomb Н.
- 1.
- Spalls J. Κ.
- Evidence of Moisture
- E. F. Leaching or Chemical Attack
- Cold Joint Lines L.
- Corrosion Staining
- RESULTS LEGEND NI NO INDICATIONS RI RECORDABLE INDICATION IO -- INFORMATION ONLY

  - M. Scaling / Dusting N. Coating Deterioration
  - Abrasion, Cavitation, Wear Air Voids / Bug Holes О.
  - Ρ.
  - Q. Efflorescence
  - R. Other (Explain)

COMPONENT / ITEM		RESULTS		Concrete VT-1C or VT-3C Visual Examination
NUMBER AND DESCRIPTION	NI RI TYPE IO		10	COMMENTS
DESCRIPTION				
			С	Embed plates at outer corners of the buttress are exposed. Plates have surface rust with no pitting.
BUTTRESS 5			D	Inactive grease leaks (oil stains) found on tendons H53-25, H53 24 and H53-13.
BUTTRESS 5			н	Grout patches over areas of above mentioned embed plates are degraded.
				Note: The face of buttress 5 is inaccessible due to ventilation stack.
			н	Degraded grout patches around embed plates supporting drain pipe on left of buttress as previously reported. No change.
BUTTRESS 6			D	Inactive grease leaks (oil stains) found on tendons H62-26, and H62-24 on right side. H64-37 on the left side.
			С	Exposed embed plates 4" and 9" from outer corners of the buttress with active rust pitting < than 0.032" deep.
			н	Degraded patch on void in cold joint centered between buttress 5 & 6 32" below ring girder.
			С	Exposed embed plates 4" wide 2' from left of buttress 5 and 2' from right of buttress 6 from ring girder down with surface rust no pitting. Grout patches over plates are degraded.
CONTAINMENT BUILDING WALL BETWEEN BUTTRESS 5 AND			н	Degraded grout patch on cold joint adjacent to H53-43 6' from left side of buttress 5.
BUTTRESS 6			н	Previously reported degraded grout patch 2'x5' 12' above equipment hatch roof unchanged.
			A	General Area Cracks < than 0.040"
			Н	General Area 4 degraded grout patches on form tie holes.
			P	General Area small bug holes.
FUEL TRANSFER TUBE ROOM			P	Small bug holes
			Α	Small cracks < 0.010" wide
			Α	Small stress cracks < 0.010" wide
FUEL HANDLING BLD FROM 281			Ρ	Small bug holes
ELV. TO 331 ELV.			D	Grease stains on caps and bearing plates, inactive.
		Н		Grout patch with numerous cracks > 0.010" wide, previously recorded.
			Α	Small stress cracks < 0.010" wide
TURBINE BLD. FROM 305 ELV.			Ρ	Small bug holes
TO 380 ELV.			D	Grease stains on caps and bearing plates, inactive
			R	Abandoned 1/2" anchor holes
			A	Small stress cracks < 0.010" wide
INTERMEDIATE BLD FROM 295			Ρ	Small bug holes
ELV. TO 355 ELV.			D	Grease stains on caps and bearing plates, inactive
			R	Abandoned 1/2" anchor holes

# RESULTS LEGEND NI – NO INDICATIONS RI – RECORDABLE INDICATION

- G. Settlements of Deflections
- Cracks (Characterize and Size) Exposed Reinforcing Steel
- H.
- Exposed Metallic Items (Other) Evidence of Grease Leakage
- D. D. E. F. Evidence of Moisture

Α.

Β.

- Leaching or Chemical Attack
- Degraded Patches or Repairs Popouts, Voids, Honeycomb
- 1
- J. Spalls
- Κ. Cold Joint Lines
- **Corrosion Staining** L.
- IO INFORMATION ONLY
  - Μ. Scaling / Dusting
  - N.
  - Coating Deterioration Abrasion, Cavitation, Wear Ο.
  - Ρ. Air Voids / Bug Holes
  - Q. Efflorescence
  - R. Other (Explain)

COMPONENT / ITEM	RESULTS		
NUMBER AND DESCRIPTION		10	COMMENTS
		Ρ	Small bug holes
ELV. 281 INTERMEDIATE BLD.		Α	Stress cracks < 0.010" wide
(ALIGATOR PIT)	A,D		Passive cracks with oil leakage, active
	J		Spall around form tie hole, 3.5" x 2.25" x 0.25" deep
ELV. 281. (ALIGATOR PIT) BUTTRESS 5 TO 248	A D		One crack (passive), 28" long < 0.010" wide One crack (passive), 64" long < 0.010" wide
		1.4. 	Spall around construction form the hole, 3.5" x 2.25" x 0.25" de
ELV. 281. (ALIGATOR PIT) BUTTRESS 5 TO 290°	A,D		Passive crack 120" long, < 0.010" wide Passive crack 100" long, < 0.010" wide Passive crack 84" long, < 0.010" wide Passive crack 48" long, < 0.010" wide Passive crack 48" long, < 0.010" wide Passive crack 84" long, < 0.010" wide Passive crack 72" long, < 0.010" wide Passive crack 72" long, < 0.010" wide All cracks show active oil leakage
ELV. 281. (ALIGATOR PIT) BUTTRESS 6 TO 2109	A,D		Passive crack 70° long, < 0.010° wide Passive crack 48° long, < 0.010° wide Passive crack 70° long, < 0.010° wide Passive crack 70° long, < 0.010° wide Passive crack 72° long, < 0.010° wide Passive crack 69° long, < 0.010° wide Four Passive cracks 120° long, < 0.010° wide All cracks show active oil leakage
ELV. 281. (ALIGATOR PIT) BUTTRESS 6 TO BUTTRESS 1	A,D		Passive crack 74" long, < 0.010" wide Two Passive crack 71" long, < 0.010" wide Passive crack 120" long, < 0.010" wide Passive crack 72" long, < 0.010" wide Passive crack 74" long, < 0.010" wide Passive crack 120" long, < 0.010" wide Passive cracks 74" long, < 0.010" wide All cracks show active oil leakage
ELV. 281. (ALIGATOR PIT) BUTTRESS 1 TO BUTTRESS 2	A,D		Passive crack 84" long, < 0.010" wide Six Passive cracks 72" long, < 0.010" wide
ELV. 281. (ALIGATOR PIT) BUTTRESS 2 TO BUTTRESS 3	A,D		Passive crack 36" long, < 0.010" wide Passive crack 76" long, < 0.010" wide Passive crack 80" long, < 0.010" wide Passive crack 72" long, < 0.010" wide Passive crack 76" long, < 0.010" wide Passive crack 74" long, < 0.010" wide Passive crack 46" long, < 0.010" wide Passive crack 30" long, < 0.010" wide Passive crack 70" long, < 0.010" wide Passive crack 78" long, < 0.010" wide Passive crack 78" long, < 0.010" wide Passive crack 48" long, < 0.010" wide Passive crack 48" long, < 0.010" wide
ELV. 281. (ALIGATOR PIT)	A,D ,		Passive crack 70" long, < 0.010" wide Passive crack 48" long, < 0.010" wide

# RESULTS LEGEND NI -- NO INDICATIONS RI - RECORDABLE INDICATION

#### Settlements of Deflections G. **Degraded Patches or Repairs** Η.

- Cracks (Characterize and Size) Exposed Reinforcing Steel Exposed Metallic Items (Other)
- C. Evidence of Grease Leakage Evidence of Moisture D.
- Ε.
- F.

Α.

В.

- Leaching or Chemical Attack
- Popouts, Voids, Honeycomb Spalls ١.
- J. K.
- Cold Joint Lines
- L. Corrosion Staining

## IO - INFORMATION ONLY

- M. Scaling / Dusting N. Coating Deterioration O. Abrasion, Cavitation, Wear P. Air Voids / Bug Holes
- Q. Efflorescence
- R. Other (Explain)

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COMPONENT / ITEM	50 S.S.	RESULTS	J	
NUMBER AND DESCRIPTION	NI	<b>RI TYPE</b>	10	COMMENTS
BUTTRESS 6 TO H46-37		A		Crack 4" long, 0.013" wide. Previously recorded with no change in conditions
			Α	3 small stress cracks < 0.010" wide
BETWEEN BUTTRESS 4 & BUTTRESS 5		<b>A</b> ., ·		Cracks, 0.015" wide along construction pour line, previously documented
BETWEEN BUTTRESS 3 & 4, ACROSS FROM FHB ROOF		А		Crack along construction pour line previously recorded, no change in conditions
HANDRAIL AROUND DOME		J		Spalling around handrail embeds previously recorded
			A	Small cracks, < 0.010" wide
			J	Small spalls along edge of drainage trench
			R	Rusty embeds
		J		Spalling around handrail embeds – previously recorded
DOME AREA			R	Dome embeds separating from concrete previously recorded, repair made and remains stable
			R	Grout patch loss, previously recorded, repair made and remain stable
			R	Spalling around embeds, previously recorded, repairs made an remains stable
DOME AREA TENDON TRENCH BETWEEN V-144 & V-145			R	Spall in trench wall, previously recorded, repair made and remains stable
DOME AREA TENDON TRENCH			R	Bearing plates with corrosion, previously recorded, repair made and remains stable
			A	Stress cracks around dome tendon pockets all < 0.010" wide
RINGGIRDER	, ,		Н	Degraded grout patches
Maria I I I			R	Abandoned electrical boxes heavy corrosion
RINGGIRDER SE			R	Exposed rebar, previously recorded, repair made and remains stable
			Α	Small stress cracks < 0.010" wide
BUTTRESS 6 TO BUTTRESS 1 FROM RING GIRDER TO			D	Old grease stains around grease caps and on concrete around bearing plates, inactive.
NTERMEDIATE BUILDING ROOF			P	Small bug holes
		When the	H	Degraded grout patches at pour lines and form tie holes
			Α	Small stress cracks < 0.010" wide
BUTTRESS 1 TO BUTTRESS 2 FROM RING GIRDER TO			D	Grease stains around caps and on concrete around bearing plates, inactive.
TURBINE BUILDING ROOF			Ρ	Small bug holes
			н	Degraded grout patches at pour lines and form tie holes

RESULTS LEGEND NI – NO INDICATIONS RI – RECORDABLE INDICATION

Settlements of Deflections G.

Cracks (Characterize and Size) Exposed Reinforcing Steel Exposed Metallic Items (Other) Evidence of Grease Leakage Α. Β.

С. D.

Evidence of Moisture

- E. F. Leaching or Chemical Attack
- Degraded Patches or Repairs Popouts, Voids, Honeycomb Η. I.
- J. Spalls
- Κ. Cold Joint Lines
- Corrosion Staining L.

IO - INFORMATION ONLY

- M. Scaling / DustingN. Coating DeteriorationO. Abrasion, Cavitation, Wear
- Ρ. Air Voids / Bug Holes
- Q. R. Efflorescence Other (Explain)

Table V: Three Mile Island - Containment Concrete VT-1C or VT-3C Visual Examination							
COMPONENT / ITEM	RESULTS						
NUMBER AND DESCRIPTION	NI RI TYPE		10	COMMENTS			
			A	Small stress cracks < 0.010" wide			
BUTTRESS 2 TO BUTTRESS 3			Ρ	Small bug holes			
FROM RING GIRDER TO TURBINE BUILDING ROOF			D	Grease stains around caps and on concrete around bearing plates, all inactive.			
			Н	Degraded grout patches at pour lines and form tie holes			
			Α	Small stress cracks < 0.010" wide			
BUTTRESS 3 TO BUTTRESS 4			Ρ	Small bug holes			
FROM RING GIRDER TO FHB ROOF			D	Grease stains around caps and on concrete around bearing plates, all inactive.			
		н		Grout patch with numerous cracks > 0.010" wide, previously recorded			
			A	Small stress cracks < 0.010" wide			
· · · · · · · · · · · · · · · · · · ·			Ρ	Small bug holes			
BUTTRESS 4 TO BUTTRESS 5 FROM RING GIRDER TO 305 ELV			D	Grease stains around caps and on concrete around bearing plates, all inactive.			
		н		Grout patch with numerous cracks > 0.010" wide, previously recorded			
NI – NO INDICA A. Cracks (Characterize and Siz B. Exposed Reinforcing Steel		S RI – RECC G. Settlem	ORDA	TS LEGEND BLE INDICATION IO – INFORMATION ONLY of Deflections M. Scaling / Dusting atches or Repairs N. Coating Deterioration			

Popouts, Voids, Honeycomb

Ι.

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C. Exposed Metallic Items (Other)
D. Evidence of Grease Leakage
E. Evidence of Moisture
F. Leaching or Chemical Attack

- J. Spalls K. Cold Joint Lines L. Corrosion Staining
- O. Abrasion, Cavitation, Wear
  P. Air Voids / Bug Holes
  Q. Efflorescence
  R. Other (Explain)

TM-N1043-500: Appendix H,
Revision 0, Page 6 of 62

1301-9.1 Revision 20 Page 15 of 16

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	ENCLOSURE 6 Data Sheet 10 General Containment Inspection Results	1301-9.1 Revision 20 Page 15 of 1
Mat Foundation in Tendon Gallery	,	
Tendon Grease Caps Evidence of inactive grease	Icaks ON H53-13,24, AND 25/H62-24,	26,28, and H64-3
Buttress 1 to 2		
	· · · · · · · · · · · · · · · · · · ·	
Buttress 2 to 3		****
		·····
Buttress 3 to 4		
Cognizant Mech/Struct Engineer-	AST HOWARD T. HILL C.E. Date: /	6 FEB/0
Performed By:	Date:	

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TM-N1043-500: Appendix H, Revision 0, Page 7 of 62

# ENCLOSURE 6 Data Sheet 10

1301-9.1 Revision 20 Page 16 of 16

Buttress 4 to 5	General Containment Inspection Results	Page 16 of 16
Buttress 5 to 6 VT-3C preformed	1 8-22-09, Previously reported could	tions, NO change
General condition	8-22-09. Previously reported condi ous-small bugholes, small cracks, d able.	egraded growt
Buttress 6 to 1	· · · · · · · · · · · · · · · · · · ·	
Dome Area		
Cognizant Mech/Struct Eng.	ineer Anner Hitt, P.E.) Date:	16 FEB 10
Performed By:	Date:	

TM-N1043-500: Appendix H, Revision 0, Page 8 of 62

#### ENCLOSURE 6 Data Sheet 10 General Containment Inspection Results

1301-9.1 Revision 20 Page 15 of 16

Mat Foundation	in	Tendon	Gallery

- ----

	Tendon Grease Caps <u>Anne Grea Marie Status, NE- Diale, NB, US, UB, IB, IB, E-D218, 217, 218, 228, 127, 228, 229, 239, 239, 239 + 2 (8, 5-D</u> 325
	1008 TRADON CARE BUTT. * 4 - H42-49 + H42-51, BUTT. * 3 - H31-51 + H31-55, BUT 2 - H24-47 + H24-51
	Buttress 1 to 2 SMALL STRETS CLAURE, SAME BUANALET, DETROD OF AROUT FATCHES - ALLEFTADLE
	- INDUSTIONS TRAINSTUT RECEILED IN CONDICING CONDICING
	Buttress 2 to 3
	JUNESS 2 10 0
þ	Town correct FRE STORE LY & STARDED IN COLOR M CONDUTIONS
	Buttress 3 to 4
<b></b> .	GROUT PATCH WITH CRACKS >0.010 WILK - PHONICLELY TATORAS
	Cognizant Mech/Struct Engineer House T. Hill, C.S. Date: 16 F5B10
	Performed By Date: 1-20-10

### ENCLOSURE 6 Data Sheet 10 aneral Containment Inspection Results

Rut	tress 4 to 5		General Cont			
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	- <b>4</b> 2					
					- 11 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	
But	tress 5 to 6					
	****	<u></u>		****		
					•	
						<u></u>
	<u></u>	<u></u>				
Butt	ress 6 to 1 Small	STRKES CRAC	18, <u>SAAU BUGA</u>	HELCS, DECTROSE	to KRANT 745	UHES - SCHOT A
	- SMALL			4265., 200895E	to 69.00 T 745	(H <del>L) - ACCOTO</del>
	- SMALL				to 68.007 7005.	V.H.L.S ALLER T. M.S.
	- SMALL				<del>&amp; 68.007 74</del> 7	\\\+ <del>\`````^\\\\\</del> ```\\
	- SMALL				<del>23 68.007 - 745</del> .	(# <del>***</del> - <u>\$\$\$</u> *** #}
	Smarl Record PAR	<u>1/100 St. Y. XETOR</u>	btb #0 #44##	E. W. CANDET THES		
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Dorr	Small Electron I The he Area Shull STR A String I TREVIEWALY	NINUS Y TETOR	20. De A ", GROWT. 35, SMULLE	TATRAS _ SAAL	+ \$78445 m/ m	16 FER JO

# ATTACHMENT 6

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report

Station: TMI       Unit: 1       Date: 3.24-09       Report No:         System: Cartaneed: Component: Toudou Gallery Base Mat       WO No(s): R2067551         Location:       Building: Cartaneed: Component: Toudou Gallery Base Mat       WO No(s): R2067551         Exam Type:       DV [GV [UV:1C] XUT-12 XUT-3C       Type Of Exam: 20 Direct [Remote Matl. Type: Cancerde: Components Coated: XI YES       No         Building: Cartaneed:       DV [GV [UV:1-12 XUT-3C       Type Of Exam: 20 Direct [Remote Matl. Type: Cancerde: Components Coated: XI YES       No         Matte Used: Subjack Rift Active X Test Card       UT or Serial No. A/A       Cal. Due Date: A/A [IIIumination Used Fash light       Illumination Verified: Date: 3.24-09       Time: 12:30 PM         Special / Specific Instructions:       More Care Component / Item Number and Description       RESULTS       Explanation / Notes         Component / Item Number and Description / (e.g. EIN, EID, etc.)       RESULTS       Explanation / Notes         Teudow Gallery Base Mart       A       As previously (Cported., ND crAcks z / 4kan: 015 'on base mat.       D         John explanations / NoteS.       Care planations / NoteS.       Call black and transfer And autor       Mails where they match as white exposed metal fash / A parts to be changed transfer And autor         Note C. Rages 2,384 Serve       Q.       Carthaneed And Active Correstion       Care planatis ns / resorable indication to - Information only		Page 1	of 1			
Location:       Building: Carbin month Elev:       Col:       Row:       Azimuth/Radius:         Exam Type:       DV [GV [JT-1C [SVT-3C] Type Of Exam: Splicet:       Mail: Type: Concrete:       Mail: Type: Concrete:         Design Drawing(s)       Visual Aids: Nave:       Mail: Nave:       Mail: Type: Concrete:       Mail: Type: Concrete:         Surface:       ID       DD       Surface / Components Coated:       YES       NO         Matter Used:       Sale Rat At the Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail					No:	
Location:       Building: Carbin month Elev:       Col:       Row:       Azimuth/Radius:         Exam Type:       DV [GV [VT-1C [SVT-3C] Type Of Exam: Splicet:       Mail: Type: Concrete:       Mail: Type: Concrete:         Design Drawing(s)       Visual Aids: Nave:       Mail: Nave:       Mail: Type: Concrete:       Mail: Type: Concrete:         Surface:       ID       DD       Surface / Components Coated:       YES       NO         Matter Used:       Sale Rat At the Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail of Mail	System: Tendens Component: Tenden	Gallery BA	se Mat	. WO No	(s):: <i>R2067551</i>	
Design Drawing(s)       Visual Aids: Now         Surface:       ID       COD       Surface / Components Coated:       NO       NO         MATE Used: Surface:       ID       Coll       Surface / Components Coated:       NO       NO         Special / Specific Instructions:       // Are       Cal. Due Date: N/A       Cal. Due Date: N/A         Tilumination Used Flash light       Illumination Verified:       Date: 3 - 24 - 09       Time: 12:30 PM         Special / Specific Instructions:       // Are       RESULTS       Explanation / Notes         Component / Item Number and       RESULTS       Explanation / Notes         Component / Item Number and       RESULTS       Explanation / Notes         Component / Item Number and       RESULTS       Explanation / Notes         Teudow Gallery Base Matt       A As previously reported_No cracks         Note:       fages 2,3 & 9 & Serve       Q       Efforescence an inver And outer         valis where the value date factor       valis where the value date factor       valis where the value date factor         for explanation 5 /wolfes.       Cracks (Characterize and Size)       G       Settlements or beliections       M. Scaling / Dusing         A       Cracks (Characterize and Size)       G       Settlements or belescions       M. Scaling / Dusing <td></td> <td></td> <td></td> <td></td> <td>Azimuth/Radius:</td> <td></td>					Azimuth/Radius:	
Surface:       ID       OD       Surface / Components Coated:       IV PS       NO         M&TE Used:       Sulface / Sulface / Components Coated:       IV PS       NO         M&TE Used:       Sulface / Sulface / Components Coated:       IV PS       Cal. Due Date:       A         Illumination Used f / Sulface       Illumination Verified:       Date:       8: 24.09       Time:       12:30 PM         Special / Specific Instructions:       Afface       RESULTS       Explanation / Notes       Explanation / Notes         Component / Item Number and Description       NI       RI TYPE       IV       As a minimum, Record Location and Size of Recordable Indications as applicable)         Teudow Gallery Base Mat       A As previously reported, no cracks       Z + han : 015 ''on base mat .       Q         Note:       , Pages 2, 3 & 4 Scrue       Q       Efflorescence winker Aid outer walls where the base mat .       Q         only as Continuation Sheets       Results Legend:       walls where the base mat .       Q       Efflorescence winker Aid outer mations / hates.         for exiglianation / Notes       Recordable Indication Type Codes:       Recordable Indication Type Codes:       C, H Degraded Patches or Repairs       No         for exiglianation / Notes       Recordable Indication Tope Codes:       Scaling / Dusting       Scaling / Dusting	Exam Type: DV DV DVT-1C XV	T-3C Type O	f Exam: 🗴	Direct Remote	Matl. Type: Concre	te
M&TE Used: Size 21 A1 10 X Test Card       UTC or Serial No. A/A       Cal. Due Date: A/A         Illumination Used FAsh light       Illumination Verified:       Date: § -24 - 67       Time: 12:30 FM         Special / Specific Instructions:       No. A/A       Explanation / Notes         Component / Item Number and Description       RESULTS       Explanation / Notes         Component / Item Number and Description       NI       RITYPE TO       (As a minimum, Record Location and Size of 1         Recordable Indications as applicable)       Recordable Indications as applicable)       Recordable Indications as applicable)         Tendow Gallery Base Mart       A       As previously reported, ND cracks         Note:       Pages 2,334 Scrue       Q       Efflorescence on inter And outer         Note:       Recordable Indication set applicable)       Recordable Indication and Size of 1         Results Legend:       Q       Efflorescence on inter And outer         Note:       Notes:       Recordable Indication IO - Information Only         Results Legend:       Ni - No Indications       Ril - Recordable Indication IO - Information Only         Recordable Indication Type Codes:       Settlements Or Deflections       M. Scaling / Dusting         Recordable Indication Type Codes:       Settlements Or Deflections       M. Cracks (Characterize and Size)	Design Drawing(s)					
Illumination Used Flash light       Illumination Verified:       Date: 8-24-09       Time: 12:30 AM         Special / Specific Instructions:       Note       Explanation / Notes         Component / Item Number and       RESULTS       Explanation / Notes         Description       NI       RI TYPE       O       As a minimum, Record Location and Size of Recordable Indications as applicable)         Tendow Gallery Base Mat       A As previously reported, NO cracks       Z than 1015 "ON base matt.         Note:       Pages 2, 3 > 4 scrue       Q       Efflorescence on inver And outer walls where they meet the base matt.         only as continuation sheets       Results Legend:       Notes and truncets at values         for explanations/Notes.       Results Legend:       Notes corresion.         Ni-No indications RI-Recordable Indication Type Codes:       M. Scaling / Dusting         A Cracks (Characterize and Size)       G. Settlements Or Delections       M. Scaling / Dusting         B Exposed Metalic them (Other)       Populas, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         C Exposed Metalic them (Other)       Populas, 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	Surface: ID (OD)	Surface		the second second second second second second second second second second second second second second second s	المزادي والمتصادين بيروي فيستبد والمتعا والمتحال الشريان ويجاك والمتعا	
Special / Specific Instructions:       Mode         Component / Item Number and Description       RESULTS       Explanation / Notes         Description       NI       RI TYPE       O       (As a minimum, Record Location and Size of Recordable Indications as applicable)         Teudow Gallery Base Mat       A       As previously reported_into content       No cracks         Note:       Pages 2,334 Serve       Q       Efflorescence on inverted and outer walls where they meet the base         only as cont in uation sheets       Results where they meet the base       mat. No change         for explanations / Notes       C,H       Degraded grout pattices with exposed metal that pears to be how baring plates and inver         Ni. No indications       RI-Recordable Indication Type Codes:       M. Scaling / Dusting         A       Cracks (Characterize and Size)       G.       Settlements or Deflections         B       Exposed Metalic Items (Other)       Population, Cavitation, Wear         D.       Evidence of Grease Leakage       J.       Spalia         D.       Spalia       P.       Code Joint Lies       Q         E. Evidence of Metalic Items (Other)       Population Type Codes:       N.       Scaling / Dusting         B       Exposed Metalic Items (Other)       Population Spalia       P.       Active Corresion A	M&TE Used: She Sale R21 42.10 M Test	Card UTC or				
Component / Item Number and Description (e.g. EIN, EID, etc.)       RESULTS       Explanation / Notes         Teudow Gallery Base Mat       A As previously reported, NO cracks Z + han, ol 5 "on base mat.       A         Note:       Pages 2, 3 & y serve       Q Efflorescence on inver And outer walls where they meet the base for explanations / Notes.       Q         for explanation / Notes       Results Legend:       Q Efflorescence on inver And outer walls where they meet the base mat. No change         for explanations / Notes.       Results Legend:       Results Legend:         Ni - No indications       Results Legend:       N. Scaling / Dusting         Recordable Indication Type Codes:       Recordable Indication Type Codes:         A. Cracks (Characterize and Size)       G. Settlements or Deflections       M. Scaling / Dusting         B. Exposed Meinforcing Steel       I. Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         D. Evidence Of Grease Leakage       J. Spails       P. Air Voids / Bug Holes         F. Leaching Or Chemical Attack       L. Corrosion Staining       R. Other (Explain)         Supplemental Information Rever       Explains       Datte 8:24-09         Station or be completed only if Examiner/Evaluator notes RI or Unacceptable condition.       Results: Acceptable         Results: Acceptable       Yes       No         Results: Acceptable		lllu	mination V	erified: Date: 8-24	1-09 Time: 12:3	0 PM
Description       NI       RITYPE       10       (As a minimum, Record Location and Size of Recordable Indications as applicable)         Teudow Gallery Base Mat       A       As previously Kported, NO cracks         Note:       Rages 2,334 serve       Q       Efflorescence on invert And outer Walls where they meet the base         only as continuation sheets       Q       Efflorescence on invert And outer Walls where they meet the base         for explanations/hotes       Results Legend:       Results Legend:         NI - No Indications       RI - Recordable Indication 10 - Information Only         Results Legend:       Results Legend:       Nearous of Status         NI - No Indications       RI - Recordable Indication 10 - Information Only       Recordable Indication Type Codes:         A. Cracks (Characterize and Size)       G       Settlements Or Deflections       N. Coating Dusting         B       Exposed Metalic Items (Other)       I. Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         D. Evidence Of Grease Leakage       J. Spalls       P. Air Voids / Bug Holes       C. Efflorescence         F. Leaching Or Chemical Attack       L. Corrosion Staining       R. Other (Explain)       Supplemental Information : Mear         Supplemental Information : Mress       Level.       DATE       8:24-09         Station to be completed only if Examin			<u></u>			
(e.g. EIN, EID, etc.)       Recordable Indications as applicable)         Teudow Gallery Base Mrt       A As previously Reported, ND cracks         Note:       Pages 2,334 serve       Q Efflorescence on invert And outer walls where they meet the base math.         only as continuation sheets       Q Efflorescence on invert And outer walls where they meet the base math.         for explanations/Notes.       Q Efflorescence on invert And outer walls where they meet the base math.         for explanations/Notes.       Q Efflorescence on invert And outer walls where they meet the base math.         for explanations/Notes.       Q Efflorescence on invert And outer walls where they meet the base method walls where they meet they meet they meet they meet they base method walls where they meet base of the base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls where they meet base of the pathes and inver walls the pathes and the pathes and the pathes and the pathes and the pathes and the pathes and the pathes and the pathes of the pathes and pathes and they meet base of the pathes of	•			•		
Tendow Gallery Base Matt       A       As previously reported, ND cracks         Note:       Pages 2,334 serve       Q       Efflorescence on inver And outer walls where they meet the base mat.         Only as continuation sheets       Q       Efflorescence on inver And outer walls where they meet the base mat.         for explanations /Notes.       Q       Efflorescence on inver And outer walls where they meet the base mat.         for explanations /Notes.       C, H       Degraded grout pathes with exposed metal that Apears to be howeved transpets at various locations between bearing plates and inver mall with active corresion.         Ni. No indications       Risecordable indication 10 - Information Only       Results Legend:         A. Cracks (Characterize and Size)       G       Settlements Or Deflections       M. Scaling / Dusting         B. Exposed Metalic terms (Other)       I. Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         C. Exposed Metalic terms (Other)       I. Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         D. Evidence Of Moisture       K. Cold Joint Lines       Q       Efflorescence         F. Leaching Or Chemical Attack       L. Corrosion Staining       R. Other (Explain)         Supplemental Information is Mress       M. Buse. Butt.       LEVEL       DATE 8.24-09         STATION/ADMIN REVIEW       Even Subits       Date 2/1/2010       DATE 8		NI RITTPE				
Verdex       Gallery       Dase Mitt         Note:       Rages 2,334 serve       Q       Efflorescence and inver And outer mails where they meet the base mat.         only as continuation sheets       Q       Efflorescence and invert the base metal that apens to be abandoned trumpets at various inver walls where they meet the base metal that apens to be abandoned trumpets at various inver wall with active corresion.         Results Legent       Results Legent       Not Active corresion.         Ni-No indications       Ri-Recordable Indication 10 - Information Only       Interpret the base of the proves in the corresion.         Results Legent       Ni-No indications       Ri-Recordable Indication Type Codes:       N. Coating Deterioration         A. Cracks (Characterize and Size)       G       Settlements of Deflections       M. Scaling / Dusting         B. Exposed Metalic 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. Efforescence         F. Leaching of Chemical Attack       L. Corrosion Staining       Results: Acceptable         Supplemental Information: Mate L. Corrosion Staining       Date 3/21/2010         Results: Acceptable       Mines       Date 3/21/2010         Results: Acceptable       Mate Mate						
Note:       Pages 2,334       serve         Only as continuation sheets       Q       Efflorescence and inver ANd outer         for explanations/Notes.       Q       Efflorescence on inver ANd outer         Note:       Note:       Note:       Note:         for explanations/Notes.       Q       Efflorescence on inver ANd outer         Note:       Note:       Note:       Note:         Note:       Note:       Note:       Note:         Note:       Note:       Note:       Note:         Note:       Results Legend:       Note:       Note:         Note:       Results Legend:       Note:       Note:         Note:       Results Legend:       Note:       Note:         A:       Cracks (Characterize and Size)       G.       Settements 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:       Spalis       G.       Efflorescence       M.       Coating Deterioration         C:       Exposed Metallic Items (Other) <td>Tendon Gallery Base Mat</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Tendon Gallery Base Mat					
only as continuation sheets         for explanations/Notes.         for explanations/Notes.         mat. No change         c, H         Degraded grout pathes with exposed metal that Apears to be abundowed trumpets at various iocations between bearing plates and inher wall with active corresion.         NI-No indications       R1-Recordable Indication 10 - Information Only         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 Reinforcing Steel       H. Degraded Patches or Repairs       N. Coating Deterioration         D. Evidence Of Grease Leakage       J. Spalls       P. Air Voids / Bug Holes         E. Evidence Of Moisture       K. Cold Joint Lines       Q. Efforescence         F. Leaching Or Chemical Attack       L. Corrosion Staining       R. Other (Explain)         Supplemental Information : RIYES       Acceptable       Moter         Results: Acceptable       Method       Date 3::24-09         Statiltoria Sign)       Evanded only if Examiner/Evaluator notes RI or Unacceptable condition.         RI or Unacceptable results Acceptable       Yes       No         Additional Actions:       Action Repuest, Work Order, Issue Report, etc. Ininitated for Corrective Actions:       Action						
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		d for Corrective Act	and the second second	o T. Anis (SS) DAT	E:15 Fer 10	

Page 1 of 4

# ATTACHMENT 6

# ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report

	Page 1 d	of 1
Station: TMI Unit: 1	Date: 8-	
System: Tendows Component: Tendow	Gallery Bas	se Mat WO No(s) .: R2067551
Location: Building: Contain meant Elev		Col.: Row: Azimuth/Radius:
Exam Type: DV GV VT-1C		Exam: Direct Remote Matl. Type: Concrete
Design Drawing(s)		Nids: None
Surface: ID OD		/ Components Coated: X YES NO
M&TE Used: Shel Sale RZI A LID Test		Serial No. N/A Cal. Due Date: N/A
Illumination Used Flash light	เเนก	nination Verified: Date: 8-24-09 Time: 12:30 AV
Special / Specific Instructions: Nonc. Component / Item Number and	RESULTS	Explanation / Notes
Description	NI RI TYPE	
(e.g. EIN, EID, etc.)		Recordable Indications as applicable)
Tendon Gallery Base Mat		C Exposed Metal Hem between V-4 & 5 2"Longx
		1/2" wide with active corroslow.
		Exposed Metal Hem botween V5E6 3"Lowsx
see Note on page 1.		1/2" wide with active corrosion.
		E Evidence of moisture on outer NAll between
		V-80 And V-90 with efflorescence, and stalactites forming
		C Exposed embed plate adjacent to outer wall
		From V-99 to V-113 has active corrosion on sofface with pitting = than .010" deep.
	Results	Legend:
NI - No Indication		able Indication IO – Information Only
A. Cracks (Characterize and Size) G.	Settlements Or De	ation Type Codes: affections M. Scaling / Dusting
B. Exposed Reinforcing Steel H.	Degraded Patches	s or Repairs N. Coating Deterioration
C. Exposed Metallic Items (Other) I.	Popouts , Voids, H	· · · · · · · · · · · · · · · · · · ·
D. Evidence Of Grease Leakage J. E. Evidence Of Moisture K.	Spalls Cold Joint Lines	P. Air Voids / Bug Holes Q. Efforescence
	Corrosion Staining	
Supplemental Information : Yes No	Sketch X	Photo Video Other (Describe):
	sults: Acceptable	XYes No
EXAMINER/EVALUATOR	Pill-	LEVEL I DATE 8-24-09
(Print & Sign) W. RANCE Robbins M. KAMLE STATION/ADMIN REVIEW		
(Print & Sign) Evan	Johnson C	DATE 2/1/2010
This section to be completed on	ily if Examiner	/Evaluator notes RI or Unacceptable condition.
RI or Unacceptable results Acceptable	🗹 Yes 🗌 N	No
Additional Actions:		
(Action Request, Work Order, Issue Report, etc. initiate	d for Corrective Actic	n)
LEVEL III or RE REVIEW (as applicable)	hand	(HOWARD T. PHILL RE) DATE: 16 FEB 10
ANII REVIEW (as applicable)		DATE:
/	D	. /1

Page 2 of 4

DURINS 43 D YEAR

5 M VEILLANCE

## ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1

	rayer					
Station: TMI Unit: 1	Date: g.	24-09		Report N	lo:	
System: Tendous Component: Tendou	Gallery Bas	se Mat		WO No(s	s).: R2067551	
Location: Building: Containment Elev		Col.:	Row:		zimuth/Radius:	
Exam Type: DV GV VT-1C XV		Exam: 🔀	Direct R	emote	Matl. Type: Concre	ite
Design Drawing(s)	Visual A	ids: Non	2			
Surface: ID OD	Surface		nents Coated	: 🔀 YES		
M&TE Used: She   Sale R21 42 10 Test	Card UTC or	Serial No.	NA	C	al. Due Date: N/A	
Illumination Used Flash light	lilun	nination V	erified: Da	te: 8-24	-09 Time: 12:	SO PM
Special / Specific Instructions: None						
Component / Item Number and	RESULTS			Explanation		
Description (e.g. EIN, EID, etc.)	NI RI TYPE	Red	cordable Indica	ations as ap		1
Tendon Gallery Base Mat		H De	graded are	A of grou	H/concrete	4
		At	outeredg	le of V-	50 bearing pla	<i>c.</i>
		We	removed 1	cose ma	torial And reco	dec
See Note on page 1		me	surements	4.5 Tow	9 x .75 Wide X .	deep.
		00	ter edge of	bearing	plate has surf,	ke
		10	st with n	10 pitti	NG.	
	L,N	V-8	H Grease ca	p flange	conting is deterior rosion VT-1 wi	betard
				tive tol	rosion vt-1 w	lbe
		and the second second second second second second second second second second second second second second second	formed.			
NI - No Indication	Results	Legend:	n 10 - Informa	tion Only		,
	Recordable Indic					<b>L</b>
A. Cracks (Characterize and Size) G.	Settlements Or De	flections	M. S	caling / Dust	ing	
B. Exposed Reinforcing Steel H.	Degraded Patches			oating Deter		
C. Exposed Metallic Items (Other) I. D. Evidence Of Grease Leakage J.	Popouts, Voids, H Spalls	loneycomb		orasion, Cav ir Voids / Bug	itation, Wear	
	Cold Joint Lines			fflorescence	g i loica	1
	Corrosion Staining			ther (Explain		·
Supplemental Information : XYes No	Sketch XI			er (Describe	e):	
	suits: Acceptable	Ye	s 🗌 No			
EXAMINER/EVALUATOR	1. Valle		LEVEL	π	DATE 8-24-	80
(Print & Sign) W. Ravce Robbins W. Rave STATION/ADMIN REVIEW		•				
(Print & Sign) Evan	-sendo U	$\underline{\ }$		DATE	2/1/2010	
This section to be completed on	ly if Examiner	/Evaluato	r notes RI o	r Unaccep	stable condition.	
RI or Unacceptable results Acceptable	Yes D	to See S	6.6.0 0,000	Super 6		
·/			and the c	1181 (95 176	C SARCING 1	_
Additional Actions: VEY ENG CAR (26Mg) - Addition Request, Work Order, Issue Report, etc. Initiate	d for Corrective Actig	mb (207	ANCAS INSIDA	E GALLCET	CIRCLO	$\sum$
LEVEL III or RE REVIEW (as applicable)		Hannes	T. Hill, G	E.) DATE	:16 FEB 10	
ANII REVIEW (as applicable)				DATE	:	$\angle$
	Page <b>3</b> of	4				
			G BER	and a	A TO T END CK	P
,			FLAM	50 -	REFENDER	NINCO

# 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

ray	gelori		
Station: TMI Unit: 1 Date	e: 8-24-	09 Report No:	
System: Tendons Component: Tendon Gallery	Base N	NAT WO No(S) .: R2067551	
Location: Building: Containment Elev .:	Col.:	Row: Azimuth/Radius:	
Exam Type: DV GV VT-1C VT-3C Ty	pe Of Exam	n: Direct Remote Matl. Type: Coverete	٢.
Design Drawing(s) Vis	sual Aids: 🖌		
Surface: ID (OD) Su	urface / Corr	nponents Coated: X YES INO	
	TC or Serial		
Illumination Used Flash light	Illuminatio	on Verified: Date: 8-24-09 Time: 12:30	PM
Special / Specific Instructions: None			
	SULTS	Explanation / Notes	
Description NI RI (e.g. EIN, EID, etc.)	TYPE	(As a minimum, Record Location and Size of Recordable Indications as applicable)	
Tendon Gallery Base Mat	H	Degraded grout patch on rough fu	
		concrete Area between V-TT ANDV	
See note on page )		Also Adjacent to outer edge of V-	.77.
		outer edge of exposed bearing plate	
		V.77 has active corrosion. A VT1 u	
		be preformed.	
	N	Concrete surface coated with sealant Ari	e
· · · · · · · · · · · · · · · · · · ·		pealing in areas through out gallery.	
NI - No Indications RI - R	Results Legend	d: ication 10 - Information Only	
	le Indication Ty		
	s Or Deflection		
	Patches or Rep		[
C. Exposed Metallic Items (Other) I. Popouts , V D. Evidence Of Grease Leakage J. Spalls	/oids, Honeycc	omb O. Abrasion, Cavitation, Wear P. Air Voids / Bug Holes	1
E. Evidence Of Moisture K. Cold Joint L	lines	Q. Efflorescence	
F. Leaching Or Chemical Attack L. Corrosion S	Staining	R. Other (Explain)	
	h XPhoto		
Results: Acce	ptable	Yes No	
EXAMINER/EVALUATOR (Print & Sign) W. Rance Robbins W. Panco Lol	1=	LEVEL DATE 8.24-04	a
	1	- 1 -	·
(Print & Sign) Evan John Som	1	DATE 2/1/2010	
This section to be completed only if Exan	niner/Evalu	ator notes RI or Unacceptable condition.	
RI or Unacceptable results Acceptable X Yes	🗌 No 🛛	1-177 GUALLA TIDI	ŀ
Additional Actions: Concoston Localized ; 1.	ーワア メりぬじ	UNING YOTH YEAR SURJEWARDE	
(Action Request, Work Order, Issue Report, etc. initiated for Correcti	ve Action) D	DRING 402 TENA SURVEILLANCE	
LEVEL III or RE REVIEW (as applicable)	LO H	MAROT. HILL RE. DATE: 16 FEG. 10	-
ANII REVIEW (as applicable)		DATE:	

Page <u>4</u> of <u>4</u>

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## 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 Pare 1 of 1

		rage i	ULI		
Station: TMI	Unit: 1	Date: 8.		Report No:	
System Containent Comp	onent: Tendon	Gallery B.	ise Mat	WO No(s).: R	2067551
Location: Building:رسی		•			h/Radius:
Exam Type: DV GV	VT-1C	<b>F-3C</b> Type Of	Exam: Direct	Remote Matl.	Type: Concrete
Design Drawing(s)		Visual A	ids: None		
Surface: ID OL	2	Surface	/ Components C	oated: 🔀 YES	] NO
M&TE Used Stel Sale R21	AL Due X Test C	ard UTC or	Serial No. N/A	Cal. Du	e Date: N/A
Illumination Used Flash			nination Verified:	Date: 8-24-69	Time: 12:30 AM
Special / Specific Instruct	tions: None				
Component / Item Nu	mber and	RESULTS		Explanation / Not	
Description		NI RI TYPE		num, Record Location a	<b>1</b>
(e.g. EIN, EID, e				Indications as applicab	
TENDON GALLERY BASE	Mat	B	Previous	y Reported expos	ied redar
Area adjacent to	V-89-Teldoid		Adjacent	to 189 tendos	r, No change .
Mich Adjitore .					
	1		}		
					•
			Legend:		
······	NI - No Indications		ble Indication IO – I ation Type Codes:	Information Only	
A. Cracks (Characterize and	iSize) G. S	Settlements Or De		M. Scaling / Dusting	ł
B. Exposed Reinforcing Stee		Degraded Patches		N. Coating Deterioration	
C. Exposed Metallic Items (		Popouts, Voids, H	oneycomb (	D. Abrasion, Cavitation,	Wear
D. Evidence Of Grease Leal		Spalls		<ol> <li>Air Voids / Bug Holes</li> </ol>	
E. Evidence Of Moisture		Cold Joint Lines Corrosion Staining		Efflorescence     Other (Explain)	
F. Leaching Or Chemical Att Supplemental Information :	Tyes MNo	Sketch		R. Other (Explain)	
Supplemental mormation .	and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	ults: Acceptable		and the second second second second second second second second second second second second second second second	
EXAMINER/EVALUATOR (Print & Sign) W. RANCE, Ribbin		e Polt-		VEL I DA	TE 8-24-09
STATION/ADMIN REVIEV		6- 71		DATE 2/	
	completed onl	v if Examiner/	Evaluator notes	RI or Unacceptable	and the second second second second second second second second second second second second second second second
RI or Unacceptable result	•	Yes N			
Additional Actions: EX All	ALC ALANS A	upur an	H YEAR THE	NEILLANCE	
(Action Request, Work Order, Issue	Report, etc. initialed	for Corrective Action	1		
LEVEL III or RE REVIEW	(as applicable)	a free	HONIAD T. Hu	F. DATE: 161	ETE 10
ANIL REVIEW (as applicable)	, Milliot yr, yr an fairi fyr yng Millynia y Millyniau (fwr			DATE:	

#### TM-N1043-500: Appendix H, Revision 0, Page 15 of 62

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 Unit: 1 Date: 8-24-09 Station: TMI Report No: System Tondows Component: Tendon Gallery Base Mart WO No(s) .: R.2067551 Col.: Elev.: Azimuth/Radius: Building: Containment Row: Location: Exam Type: DV GV XVT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Coverete Visual Aids: None Design Drawing(s) Surface / Components Coated: X YES Surface: ID **(**OD NO M&TE Used: Shil Sale Ral 4 Cio X Test Card UTC or Serial No. 4/A Cal. Due Date: N/A Illumination Verified: Illumination Used Flash light Date: 8-24-09 Time: 12:30 PM Special / Specific Instructions: None Component / Item Number and RESULTS Explanation / Notes **RI TYPE** Description NI 10 (As a minimum, Record Location and Size of Recordable Indications as applicable) (e.g. EIN, EID, etc.) TENDON GALLERY BASE Mat Previously Reported exposed rebar B Area adjacent to V-89-Fieldowd Adjacent to V89 tendow, No change! Results Legend: RI - Recordable Indication IO - Information Only NI - No Indications Recordable Indication Type Codes: G. Settlements Or Deflections Cracks (Characterize and Size) Μ. Scaling / Dusting Α Exposed Reinforcing Steel H. **Degraded Patches or Repairs** N. **Coating Deterioration** 8. Popouts , Voids, Honeycomb Exposed Metallic Items (Other) 0 Abrasion, Cavitation, Wear 1. C. Evidence Of Grease Leakage Spalls Ρ. Air Voids / Bug Holes D. J. **Evidence Of Moisture** K. **Cold Joint Lines** Q. Efflorescence E. Leaching Or Chemical Attack L **Corrosion Staining** R. Other (Explain) F Supplemental Information : Yes XNo Sketch Photo Video Other (Describe): Results: Acceptable Yes No EXAMINER/EVALUATOR LEVEL 8-24-09 Π_ DATE (Print & Sign) W. RANCE Robbin S STATION/ADMIN REVIEW DATE (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable 1 No Additional Actions: EXAMINE REAM DURING 4054 YEAR SURVEILLEANCE (Action Request, Work Order, Issue Report, etc. initiated for Corregive Action) LEVEL III or RE REVIEW (as applicable) + as OWARD & WILL C.E. DATE: FERIO ANII REVIEW (as applicable) DATE:

### TM-N1043-500: Appendix H, Revision 0, Page 16 of 62

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: TMI Unit: 1		ate: g.					
System. Tendons Component: Tendo	N GAL	len Ba	sc_/	Mat WO No(s) .: R.2067551			
Location: Building: Containment Eler		•	ol.:	Row: Azimuth/Radius:			
Exam Type: DV GV XVT-1C V				m: Direct Remote Matl. Type: Courses			
Design Drawing(s) Surface: ID (OD)		Visual Ai		nponents Coated: 🔀 YES 🔲 NO			
M&TE Used she sale R:21 CAL Duc X Test	Card			No. 4/A Cal. Due Date: 4/A			
Illumination Used Flash light				on Verified: Date: 8-24-69 Time: 12:30 A			
Special / Specific Instructions: None Component / Item Number and		ESULTS		Evelopedar (Nata			
Description		RI TYPE	10	Explanation / Notes (As a minimum, Record Location and Size of			
(e.g. EIN, EID, etc.)	┝┝			Recordable Indications as applicable)			
TENDON GALLERY BASE MAT		В		Exposed Rebar, previously reported,			
Area Adjacent to V-143 Field End				Adjacent to V-143, NO change.			
		:					
				*			
NI - No Indicatio	ns Ri	Results - Recordat		id: fication IO – Information Only			
	Record	able Indica	tion T	ype Codes:			
A. Cracks (Characterize and Size) G. B. Exposed Reinforcing Steel H.		nts Or Def d Patches		J			
C. Exposed Metallic Items (Other) I.	Popouts	, Voids, He		omb O. Abrasion, Cavitation, Wear			
D. Evidence Of Grease Leakage J. E. Evidence Of Moisture K.	Spalls Cold Joir	nt Lines		P. Air Voids / Bug Holes Q. Efforescence			
F. Leaching Or Chemical Attack L.		n Staining		R. Other (Explain)			
Supplemental Information : Yes No	Ske	etch 🔲 P	hoto	Video Other (Describe):			
· · · · · · · · · · · · · · · · · · ·	sults: Ac	ceptable	Þ				
EXAMINER/EVALUATOR	ce k	16		LEVEL T DATE 8-24-09			
	(						
(Print & Sign)		V6		DATE 2/1/2010			
Of a strange stable consider Assembable	ET VA	. <b>–</b> 1	-	uator notes RI or Unacceptable condition.			
RI or Unacceptable results Acceptable Additional Actions:	κ, Dυ	s ∐N 8/1€ 4	:0 I	I YEAR SUR VEILLANCE			
(Action Request, Work Order, Issue Report, etc. initiate	d for Corr	ctive Action	)				
LEVEL III or RE REVIEW (as applicable)	in 1	in the	400	MEDT. NILL P.S. DATE: 15 FEB 10			
ANII REVIEW (as applicable)				DATE:			

# 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: 8-24-09 Report No: System Tendons Component: Tendon Gallery Base Mat WO No(s) .: R.2067551 Building: Containment Elev .: Col.: Row: Azimuth/Radius: Location: Exam Type: DV DV VT-1C VT-3C Type Of Exam: Direct Remote Matl. Type: Coverente Visual Aids: None Design Drawing(s) Surface / Components Coated: X YES ODSurface: ID NO M&TE Used: Shel Sale Ral Cat Due X Test Card UTC or Serial No. N/A Cal. Due Date: N/A Illumination Verified: Illumination Used Flash light Date: 8-24-09 Time: 12:30 PM Special / Specific Instructions: None RESULTS Component / Item Number and Explanation / Notes Description RI TYPE 10 (As a minimum, Record Location and Size of ŇI Recordable Indications as applicable) (e.g. EIN, EID, etc.) TENDON GALLERY BASE Mat Exposed Rebar, previously reported, B Area adjacent to V-149-fieldered Adjacent to V-149, NO change. **Results Legend:** NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes: Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting A. Degraded Patches or Repairs ₿. Exposed Reinforcing Steel H. N. **Coating Deterioration** Exposed Metallic Items (Other) Popouts , Voids, Honeycomb 1. 0. Abrasion, Cavitation, Wear C. Spalls Evidence Of Grease Leakage J. P. Air Voids / Bug Holes D. Cold Joint Lines **Evidence Of Moisture** Κ. Q. Efflorescence E. F Leaching Or Chemical Attack L **Corrosion Staining** R. Other (Explain) Sketch Photo Video Other (Describe): Supplemental Information : Yes XNo XYes Results: Acceptable **No** EXAMINER/EVALUATOR LEVEL 11 DATE 8-24-09 (Print & Sign) W. RANCE Robbins STATION/ADMIN REVIEW Eva 21 DATE (Print & Sign) This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable K Yes No No نت و ب You Sur rectionce. Additional Actions: Examine A Goard Dure Ma (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) LEVEL III OF RE REVIEW (as applicable) NICL, P.C. DATE: 16 FEB 10 AMARC 1. ANII REVIEW (as applicable) DATE:

ER-AA-335-018 **Revision 5** Page 31 of 32

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## **ATTACHMENT 5**

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

	1 490							
Station: TMT Unit: 1	Date: 8-2	4-09	Report No:					
WO NO(S) .: R2067551	Tendon Ancho	rage No.: V-77	Tendon End: 🗌 Shop 🛛 🕅 Field					
Location: Tunnel, Gallery Buttress: Elevation: Bearing Plate I.D.: yable to /								
Bearing Plate I.D. An	Bushing I.D. N/A							
Bearing Plate I.D.     Anchor Head I.D.     N/A     Bushing I.D.     N/A       Exam Type:     DV XVT-1     Type Of Exam:     XDirect     Remote								
As Found Exam As Left Exam Following Retensioning Of Tendons Which Have Been Detentioned								
Design Drawing(s) Visual Aids: None								
M&TE Used: Sule R.21 Culdre 44-10 X Test Card UTC or Serial No. N/A Cal. Due Date: N/A								
Illumination Used Flash Light Illumination Verified: Date: 8-24-09 Time: 12:30 PM								
	AR		a = 1.01					
Component / Item Number and	RESULTS		Explanation / Notes					
		IO (Sketch Shall	Be Attached Depicting Location Of All					
			g, Protruding, Unseated Wires)					
V-77 Bearing plate	E	Active corre	osion on order edges of					
Field End		the bearing	ug plate < than . 010'deep.					
		ne on						
Note: Inspection of the baring								
plate limited to outer edges								
due to the grease cap being								
bolted in place.								
Results Legend: NI - No Indications RI - Recordable Indication IO - Information Only								
		ation Type Codes:						
A. Missing Wires		Cracks	O. Other (Explain)					
8. Missing Button Heads	I. F	Pitting						
C. Protruding / Unseated Wires		licks, Gouges, Mechanic	al Damage					
D. Broken Wires		Ineven Shim Stack						
E. Active Corrosion     L. Excessive Shim Gaps     F. Other Corrosion     M. Gasket Seating Surface Damage								
F. Other Corrosion M. Gasket Seating Surface Damage     G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections								
Supplemental Information : Yes No		the second second second second second second second second second second second second second second second s	)ther (Describe):					
for any second second second second second second second second second second second second second second second	Results: Acceptable	TYes XNo						
EXAMINER/EVALUATOR	2 011							
(Print & Sign) W. PANLE Robbins W. K	me Kolo	LEVE	L T DATE 8-24-09					
CTATIONIADMINI DEVIENI	<u> </u>		01.1.					
(Print & Sign)	John 1	and a state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second	DATE 2/1/2010					
This section to be completed	only if Examiner	/Evaluator notes R	l or Unacceptable condition.					
RI or Unacceptable results Acceptable	Di or Lingenentable regulte Accentable Mare Dia							
a series of a series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the series of the se	4.700 177 1	NCLORDIC COLA	LOWCE) TO BE RE-EXAMPED					
Additional Actions: CURRES W LOCAUSCO. V-77 ANCHARAGE AREA (LOWCE) TO BE RE-EXAMPLED (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) DURING (40 TH YEAR SURVEYCLANCE								
LEVEL III or RI REVIEW (as applicable)		Howard T. Hill	C.E. DATE: 16 FEB 10					
ANII REVIEW (35 applicable)			DATE:					

ER-AA-335-018 Revision 5 Page 31 of 32

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

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		Page	1 01	1	·····				
Station: TMI Unit: 1		Date: 8-	24-	09		Report N	No:		
WO No(s): R-2067551	<u>ر ا</u>	Tendon Anch	norage	No.:	V-84		End: 🗍 Shop		
Location: Tunnel, Gallery Buttress: Elevation: Bearing Plate I.D.: Unble to los							locate		
	Anchor	Head I.D.	J/A			Bushing I.D	. N/A		
Exam Type: DV XVT-1					and the second second second second second second second second second second second second second second second	Statement of the second second second second second second second second second second second second second se	ect Remote		
	As Left					endons Whic	h Have Been D	etentic	ned
Design Drawing(s)	X Tank			Non			al Our Data	7.	
M&TE Used Stal sale RZI Ciduc4-610 D	y lest (	Card UIC		rial No n Verifi			al. Due Date: N		
Illumination Used Flash light Special / Specific Instructions:		mann	inauor	venn	eu. Dau	e: 8-24-04	7 Time: /	2:30	PM
Component / Item Number and	one.	RESULTS		r		Explanatio	n / Notes		
Description	NI	RI TYPE	10	(S	ketch Shall		Depicting Local	tion Of	All
·							, Unseated Wire		
V-84 bearing plate		E					outer half		
and prease ran Field				gret	ISE CAP	flange	with pit	ting	
And grease CAP. Field						10" deep.		-	
Note: bearing plate inspection		Ε		7			the outer	COIN	er
limited to outer edges ave to	1	L				aine alat	c < than	010	deen.
grease cap being bolted in				OT 1	the peak	ring plat		1010	Cur.
place.									
Results Legend:		Di Dosco	dahiai	Lanianti					
NI - No Indications RI - Recordable Indication IO - Information Only Recordable Indication Type Codes:									
A. Missing Wires		H.	Crack				O. Othe	er (Exp	lain)
B. Missing Button Heads		l.	Pitting					• •	. [
C. Protruding / Unseated Wires		J.				cal Damage			
D. Broken Wires E. Active Corrosion		K.			n Stack him Gaps				
F. Other Corrosion		M.			ng Surface [	Damage			
G. Evidence Of Free Water (Quantify) N. Surface Discontinuities, Deflections									
Supplemental Information : XYes	lo [	Sketch	Phot	to 🗌	Video 🔲 🤇	Other (Descrit	be):		
	Resul	its: Acceptabl	e	Ye	s XNo			]	
EXAMINER/EVALUATOR	Press	D.I.						ا بس	
(Print & Sign) W. RANCE Robbins W.	anco	- Kour			LEVE		DATE 9	-24-1	27
STATION/ADMIN REVIEW	m)	Johnson	<u> </u>	~~~		DAT	E 2/1/20	0	
This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition.									
RI or Unacceptable results Acceptal	ble 🗍	₹Yes Γ	No	SEE	SQ 6.0	O TREA SH	G G.O FOR	1-24	
RI or Unacceptable results Acceptable Ares No SEE SO 6.0 TATA STREE 6.0 FOR 1-84 Additional Actions: 1-24 SND CAP REMOVED. NO ACTUE CARASSION ON CAP FLANCE OR									
Additional Actions: Z-C STAD Char (Action Request, Work Order, Issue Report, etc. i	nitiated fo	or Corrective Ad	tion	zan	Mr CLAT	E REERS D	TORO ERST		_
LEVEL III or RI REVIEW (as applicable)				140	WARD T	Sh (=DAT	E: 16 Fer	3/4	2
ANII REVIEW (as applicable)				-		ĎAT	Ъ:		
		Page	nf	_					
		, aya		• ·••	> Rea	Ralis Por	CT4 + 5110	CK1	e en

FRANCE S RE RE- EXAMINED DIRULE SSE YEAR CARE REE

### TM-N1043-500: Appendix H, Revision 0, Page 20 of 62

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: TMI Unit: 1	Date: 8-22-09 Report No:					
System: Tendons Component: Containing	neut bldg, Buttress 5 WO No(s) .: R	2067551				
Location: Building: Containment Elev		th/Radius:				
Exam Type: DV GV VT-1C V		Type: Concrete				
Design Drawing(s)	Visual Aids: Non					
Surface: ID (OD)		NO NO				
M&TE Used: Stel Scale R21 44 0 X Test		Le Date: N/A				
Illumination Used Sus light	Illumination Verified: Date: 8-22-09	Time: 7:30 Am				
Special / Specific Instructions: None						
Component / Item Number and	RESULTS Explanation / Not					
Description (e.g. EIN, EID, etc.)	NI RITYPE IO (As a minimum, Record Location a Recordable Indications as applicat					
Buttress 5	C Embed plates at outer co	Inder LAVP				
X Note: the face of buttress	the buffress are exposed. P	ting				
1 -	surface rust with No pit					
5 is in Accessable due to	D IN Active grease leaks (oil	stains)				
ventilation stack.	found on Fendon's H53.	25, H53-24 and				
	14 53-13					
	H Growt patches over areas o embed plates are degraded.	f Above mentioned				
	H embed plates are degraded	. 1				
	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					
	Popouts, Voids, Honeycomb O. Abrasion, Cavitation, Spalls P. Air Voids / Buo Holes	1				
	Spalls P. Air Voids / Bug Holes Cold Joint Lines Q. Efflorescence	•				
	Corrosion Staining R. Other (Explain)					
Supplemental Information : XIYes No	Sketch XPhoto Video Other (Describe):					
Re	sults: Acceptable XYes No					
EXAMINER/EVALUATOR	Pattern IEVEL IT DA					
(Print & Sign) W. Rayce Robbins W. Kame	e Pallen LEVEL IL DA	ATE 8-22-09				
Print & Sign)	John C DATE 2/	1/2010				
	ly if Examiner/Evaluator notes RI or Unacceptable	condition.				
RI or Unacceptable results Acceptable	·					
Additional Actions:						
(Action Request, Work Order, Issue Report, etc. initiate						
LEVEL III or RE REVIEW (as applicable)	AN THE (Howard T. HILL, P.E. DATE: 16	Fersjo				
ANII REVIEW (as applicable)	DATE:					

Page ____ of ____

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#### TM-N1043-500: Appendix H, Revision 0, Page 21 of 62

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: TMI Date: 8-22-09 Unit: Report No: System: Tendens WO No(s) .: R 2067551 Component: Buttress 6 Col.: Building: Containment Azimuth/Radius: Location: Elev .: Row: Exam Type: DV GV VT-1C VT-3C Type Of Exam: X Direct Remote Matl. Type: Courcete Visual Aids: None Design Drawing(s) Surface / Components Coated: (OD) 1 YES X NO Surface: ID M&TE Used: R-21 Scale calder 4610 Test Card UTC or Serial No. N/A-Cal. Due Date: N/A Illumination Verified: Illumination Used Sublight Date: 8 Time: 7: 30 AM -22-09 Special / Specific Instructions: None RESULTS Component / Item Number and Explanation / Notes Description RITYPE (As a minimum, Record Location and Size of NI 10 1 (e.g. EIN, EID, etc.) Recordable Indications as applicable) Degraded grout patches ground embed H Buttress 6 plates supporting drain pipe on let side of buttress as previously reported NO change Exposed embed plates 4 "wide 9" from outer 1 corners of the buttress with Active rust pidting < than .032" deep. D I INACTIVE grease leaks (oil stains) found ON Tendon's H62-28, H62-26, and H62-24 on Rightside. H64-37 on the left side. Results Legend: RI - Recordable Indication 10 - Information Only NI - No Indications Recordable Indication Type Codes: Settlements Or Deflections Cracks (Characterize and Size) G. M. Scaling / Dusting A. Exposed Reinforcing Steel Β. H. **Degraded Patches or Repairs** N. **Coating Deterioration** Popouts, Voids, Honeycomb С Exposed Metallic Items (Other) L Ο. Abrasion, Cavitation, Wear D. Evidence Of Grease Leakage J. Spalls P. Air Voids / Bug Holes Evidence Of Moisture K. **Cold Joint Lines** Q. Efflorescence E. F Leaching Or Chemical Attack L. **Corrosion Staining** R. Other (Explain) Sketch SPhoto Video Other (Describe): Supplemental Information : XYes No Results: Acceptable **X**Yes No EXAMINER/EVALUATOR LEVEL DATE 8-22-09 (Print & Sign) W. Rance. Robbins STATION/ADMIN REVIEW 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 Additional Actions: (Action Request, Work Order, Issue Report, etc. initiated for Corrective Action) Han RE.) DATE: 16 FER 10 YOURD ! LEVEL III or RE REVIEW (as applicable) ANII REVIEW (as applicable) DATE:

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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

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Station: TMI Unit: 1	Date:	8-22-	09 Report No:					
System Tendon's Component: Contain	ment bldg	, wall be	www.butt.5eb WO No(s): R2067551					
Location: Building: Couldisment Elev		Col.:	Row: Azimuth/Radius:					
Exam Type: DV GV VT-1C XVT-3C Type Of Exam: Direct Remote Matl. Type: Course								
Design Drawing(s)	Visu	al Aids:	Nauc	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
Surface: ID (OD) Surface / Components Coated: TYES X NO								
M&TE Used: Sule R-21 (al. due X Test Card UTC or Serial No. N/A Cal. Due Date: N/A								
Illumination Used Sva light Illumination Verified: Date: 8-22-09 Time: 7:30 A								
Special / Specific Instructions: None								
Component / Item Number and	RESU		Explanation / Notes					
Description	NI RITY	PE 10	(As a minimum, Record Location and Size of					
(e.g. EIN, EID, etc.)	<b>├</b>		Recordable Indications as applicable)					
Containment building wall		H	Degraded growt patch on cold joint Adjacent to H 53-43 6' from left					
between buttress 5 and 6.			side of buttresss					
Detween Duttiess 5			Exposed embed plates 4"wide 2'from	laft-				
Note: Page 2 serves as a continuation sheet		C	of butt. 5 And 2' from right of butt. 6					
bonting the sheet			from ring girder down with surface no	4				
a continuation that			No pitting . Grout patches over phil	3				
for explanation notes.			have a stand					
		11	Deared of onteh on void in cold joint cente	ered.				
		H	between butt. 546 32 below ring girder					
NI - No Indication		sults Leger	ication IO – Information Only					
Recordable Indication Type Codes:								
	Settlements C							
	Degraded Pat							
	Popouts , Voi Spalis	us, noneyo	omb O. Abrasion, Cavitation, Wear P. Air Voids / Bug Holes					
	Cold Joint Lin	es	Q. Efforescence					
F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain)								
Supplemental Information : XYes No Sketch XPhoto Video Other (Describe):								
Results: Acceptable XYes No								
EXAMINER/EVALUATOR	a Doll-							
(Print & Sign) W. Rance Robbins W. Pame	2 EDING		LEVEL <u>I</u> DATE 8-22 C	22				
(Print & Sign)	Toham	5	DATE 2/1/2010	1				
This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition.								
Ri or Unacceptable results Acceptable		No						
Additional Actions:								
Additional Actions. (Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action)								
LEVEL III OF RE REVIEW (as applicable)								
ANII REVIEW (as applicable) DATE:								
MALL VIL VV (as apparable)		-	UNIL.	<b></b>				
	- 4							

Page 1 of 2

# ATTACHMENT 6

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1

Station: TM I       Unit: 1       Date: g.22-09       Report No:         System for tradews       Component: Containment bldg. Wall between but 5 e 6       WO No(s):: R 2067551         Location:       Building: Containment bldg.       Col.:       Row:       Azimuth/Radius:         Exam Type:       DV GV UT-1C XVT-3C       Type Of Exam: XDirect       Remote       Matl. Type: Contract         Design Drawing(s)       Visual Aids: Marc       Surface:       NO         Surface:       ID       OD       Surface / Components Coated:       YES       NO         M&TE Used: State, R-21cil. obe       XI Test Card       UTC or Serial No. N/A       Cal. Due Date: N/A       Illumination Verified:       Date: g.22-09       Time: 7: 3D AM         Special / Specific Instructions:       Nonle       RESULTS       Explanation / Notes         Component / Item Number and Description       RESULTS       Explanation / Notes         Containment building wall       H       Previsually Reported Degraded growt hatch and free for the contain and Size of I anchart was applicable         Containment building wall       H       Previsually Reported begraded growt patients         between builterss S And G.       Results Legend:       A General Area 4 degraded growt patients         See       Not Ro       Recordable Indication IO - Information Only
System. Teudons       Component. Conditioners bildg. Hall between both 5 € 6       VVD No(5): P 2067551         Location:       Building: Conditioners bildg. Hall between both 5 € 6       VVD No(5): P 2067551         Location:       Building: Conditioners bildg. Hall between both 5 € 6       VVD No(5): P 2067551         Exam Type:       DV GV VT-1C ØVT-3C       Type Of Exam: ØDirect       Remote       Matt. Type: Concrete         Design Drawing(s)       VIT-1C ØVT-3C       Type Of Exam: ØDirect       Remote       Matt. Type: Concrete         Surface:       ID       OD       Surface / Components Coated:       YES Ø NO         M&TE Used:       Scale, R-21cil. db2 ØT Test Card       UTC or Serial No. N/A       Cal. Due Date: N/A           Illumination Used       Swn light       Illumination Verified:       Date:       8-22-09       Time: 7: 3D AM         Special / Specific Instructions:       None       None       RESULTS       Explanation / Notes         Component / Item Number and       RESULTS       Recordable Indications as applicable)       Explanation / Notes         Constainment building wall       H       Previously Reported Degraded grout Attach       Recordable Indications as applicable)         Containment building wall       H       Previously Reported Degraded grout patches       Secordable Indication IO - Information Only
Location:       Building: Couldingment Elev.:       Col.:       Row:       Azimuth/Radius:         Exam Type:       DV GV VT-1C XVT-3C       Type Of Exam: Moirect       Remote       Matt. Type: Courrete         Design Drawing(s)       Visual Aids:       Mone       Matt. Type: Courrete         Surface:       ID       OD       Surface / Components Coated:       YES       NO         M&TE Used: Scale.       R-21 al. doi:       Test Card       UTC or Serial NO.       NA       Cal. Due Date: N/A         Illumination Used Sum Light       Illumination Verified:       Date:       §-22-09       Time: 7: 3D AM         Special / Specific Instructions:       Node       Results       Explanation / Notes         Special / Specific Instructions:       Node       Results       Explanation / Notes         Component / Item Number and Description       NI       RI TYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         Containment building wall       H       Previously Reported Degraded growt patches       Sec / J2 'above equipment hatch rest         See       Note on Rage I.       H       General Arca 4 degraded growt patches       ON form tie hales.         See       Note on Rage I.       Results Legend:       H       General Arca 5 mall bug hales. </td
Exam Type:       DV GV VT-1C VT-3C       Type Of Exam: Direct       Remote       Matl. Type: Concrete         Design Drawing(s)       Visual Aids:       None       None       None         Surface:       ID       OD       Surface / Components Coated:       YES       No         M&TE Used:       Sche R-ZLah.duz       Test Card       UTC or Serial No. n/A       Cal. Due Date: n/A       Illumination Used Sun Light       Illumination Verified:       Date:       g.22-09       Time: 7:30 AM         Special / Specific Instructions:       None       RESULTS       Explanation / Notes       Explanation / Notes         Component / Item Number and Description       NI       RI TYPE       IO       (As a minimum. Record Location and Size of Recordable Indications as applicable)         Containment building wall       H       Previsously Reported Degraded grout Mitch         between builtress 5 And 6.       A General Arca Cracks < than .040"
Design Drawing(s)       Visual Aids: Abute         Surface:       ID       OD       Surface / Components Coated:       YES       NO         M&TE Used: Sule R-21 al. doe Not an analysis of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervisor of the supervi
M&TE Used: Scale R-21cal, diz X Test Card       UTC or Serial No. n/A       Cal. Due Date: n/A         Illumination Used Sum light       Illumination Verified:       Date: 8-22-09       Time: 7: 30 AM         Special / Specific Instructions:       None       Explanation / Notes         Component / Item Number and Description       RESULTS       Explanation / Notes         (e.g. EIN, EID, etc.)       NI       RI TYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         Contrainment building wall       H       Previously Reported Degraded growt Mitch Personal Area Cracks < than .040"
Illumination Used Sun light       Illumination Verified: Date: 8-22-09       Time: 7:3D AM         Special / Specific Instructions:       None       Explanation / Notes         Component / Item Number and Description       RESULTS       Explanation / Notes         (e.g. EIN, EID, etc.)       NI       RITYPE       IO       (As a minimum, Record Location and Size of I Recordable Indications as applicable)         Contrainment building wall       H       Previously Reported Degraded growt Mitch 2'x 5' 12' above equipment hatch rooff         between buffress 5 And 6.       A       General Area Cracks < than .040"
Special / Specific Instructions:       None.         Component / Item Number and Description (e.g. EIN, EID, etc.)       RESULTS       Explanation / Notes         Contrainment building wall       NI RITYPE IO       Recordable Indications as applicable)         Contrainment building wall       H       Previously Reported Degraded growt patch         between builting wall       H       Previously Reported Degraded growt patch         See Note on Page I.       A General Area Cracks < than .040"
Component / Item Number and Description (e.g. EIN, EID, etc.)       RESULTS       Explanation / Notes         Containment building wall       NI       RI TYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         Containment building wall       H       Previously Reported Degraded grout Mitch 2'x 5' 12' above equipment hatch rooff unchanged.         See       Note on Page 1.       H       General Arca Cracks < than .040"
Description (e.g. EIN, EID, etc.)       NI       RI TYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         Containment building wall between buffress 5 and 6.       H       Previously Reported Degraded grout Altch 2'x 5' 12'above equipment hatch roof unchanged.         See       Note on Page 1.       H       General Area Cracks < than .040"
(e.g. EIN, EID, etc.)       Recordable Indications as applicable)         Containment building wall       H       Previously Reported Degraded growt Mitch         between builtress 5 and 6.       Image: Containing the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state
Contrainment Duriding wait       2'x 5' 12' above equipment hatch roof         between buffress 5 and 6.       A General Area Cracks < than .040"
between buffress 5 and 6.       unchanged.         See Note on Page 1.       A General Area Cracks < than .040"
See Note on Page 1.       A General Arca Cracks < than .040"
See Note on Vage 1.       H General Area 4 degraded grout patches         NI-No 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. Ccating Deterioration         C. Exposed Metallic Items (Other)       I. Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear
ON form tic holes.         P         General Area Small bug holes.         NI - No Indications         R1 - Recordable Indication         IO - Information Only         Recordable Indication         Recordable Indication         Recordable Indication         Recordable Indication         NI - No Indications         R1 - Recordable Indication         IO - Information Only         Recordable Indication         Recordable Indication         No Indications         R1 - Recordable Indication         IO - Information Only         Recordable Indication         Recordable Indication         No Indication         Recordable Indication         No Indication         Recordable Indication         No Indication         Recordable Indication         Recordable Indication         No Indication         Recordable Indication         No Indication         Recordable Indication         No Indication         Recordable Indication         Recordable Indication         Recordable Indication         Recordable Indication         Recordable Indication         Re
P       General       Area       Small       bug holes         Results Legend:         NI - No Indications       RI - Recordable Indication       IO - Information Only         Recordable Indication       IO - Information Only         Recordable Indication       IO - Information Only         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.       Ccating Deterioration         C.       Exposed Metallic Items (Other)       I.       Popouts , Voids, Honeycomb       O.       Abrasion, Cavitation, Wear
Results Legend:         Results Legend:         NI - No Indications       RI - Recordable Indication       IO - Information Only         Recordable Indication       IO - Information Only         Recordable Indication       IO - Information Only         Recordable Indication       IO - Information Only         Recordable Indication         A. Cracks (Characterize and Size)       G. Settlements Or Deflections       M. Scaling / Dusting         B. Exposed Reinforcing Steel       H. Degraded Patches or Repairs       N. Ccating Deterioration         C. Exposed Metallic Items (Other)       I. Popouts , Voids, Honeycomb       O. Abrasion, Cavitation, Wear
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. Ccating Deterioration         C. Exposed Metallic Items (Other)       I. Popouts , Voids, Honeycomb       O. Abrasion, Cavitation, Wear
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. Ccating Deterioration         C. Exposed Metallic Items (Other)       I. Popouts , Voids, Honeycomb       O. Abrasion, Cavitation, Wear
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.         Ccating Deterioration           C.         Exposed Metallic Items (Other)         I.         Popouts , Voids, Honeycomb         O.         Abrasion, Cavitation, Wear
B.         Exposed Reinforcing Steel         H.         Degraded Patches or Repairs         N.         Ccating 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
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 Other (Describe):
Results: Acceptable     XYes       EXAMINER/EVALUATORI
(Print & Sign) N. Rance Robbins W. Kance Keller LEVEL II DATE 8.22-09
STATION/ADMIN REVIEW
(Print & Sign) Evalement DATE d/1/2010
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) // AP 14 (Hower T. Har C.E.) DATE: /6 FEB/0
ANII REVIEW (as applicable) DATE:

Page 2 of 2

## 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

	11-10	Deterret				
Station: TMI	Unit: 1	Date: /-20		F#18-111.5-		
System: w/A- Component: ~/A- WO No(s).: A Solution WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO No(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solution A- WO NO(s).: A Solutio					]	
Location: Building: Contrainment Elev.: Col.: N/A Row: N/A Azimuth/Radius:						
Exam Type: DV GV VT-1C XVT-3C Type Of Exam: Direct Remote Matl. Type: Covcean						
Design Drawing(s)		Visual A	S. BNOCULARS			
Surface: ID OD		Surface	Components Coated: 🔲 Y	ES 🗍 NO		
M&TE Used: LIGNT METER	🗌 Test Ca	ard UTC or	erial No.0002552272	Cal. Due Date: 5-14	9	
Illumination Used FEANNE	IGNT	lllun	nation Verified: Date:/-ao	-10 Time: 7:10	AM	
Special / Specific Instruction						
Component / Item Num	- ال	RESULTS		ition / Notes		
Description		NI RI TYPE	10 (As a minimum, Record L			
(e.g. EIN, EID, etc	·/		Recordable Indications a	s applicable)		
5			P Small Branger			
The Transver The Form	[	[	A SMALL CRACKS < 0.010 WIDE			
		1				
	<u> </u>	Results		******		
N	I - No Indications		a Indication 10 – Information Only	, 1		
	F	Recordable Indici				
A Cracks (Characterize and S		ettlements Or De				
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 KNo Sketch Photo Video Other (Describe):						
	Resu	its Acceptable	Yes No			
EXAMINER/EVALUATOR	1	NA	NAU			
(Print & Sign)	DANIEL P. O'S	NEA Flint	LEVEL I	DATE 1-20-10		
STATION/ADMIN REVIEW (Print & Sign)	EvenJo	shim C	DA	TE 2/1/2010	-	
	mpleted only	if Examiner/	valuator notes RI or Unacc			
RI or Unacceptable results		X Yes N				
Additional Actions.				1		
Additional Actions. (Action Request, Work Order, Issue Re	and per witiged to	or Corrective Action				
	$\sim \sim \sim$	Corrective Action	Howse T. HILL, (:E.) DA	TE. Il Cala	!	
LEVEL III or RE REVIEW (a)	applicable)	4	<b>^</b>		<del>-</del> !	
ANII REVIEW (as applicable)	·		DA	TE:	l	

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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

	لمحتمد والشرقة والتجوير ويستعد الأكافلية بمهيدهم بالمكافة فالمستهم ويرويها التكافة تشوارهم				
Station: 7MZ	Unit: 🖌		Date: 12-	17-0	9 Report No:
System: JA	Component: -//-				WO No(s).: 22/54265
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		/T-3C	the second second second second second second second second second second second second second second second s		m: Direct XRemote Matl. Type Guzzens
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Surface: ID	00				mponents Coated: YES NO
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Illumination Used			illur	ninat	on Verified: Date: 11-17-09 Time: 1100 PM
Special / Specific					
•	tem Number and		RESULTS		Explanation / Notes
	cription I, EID, etc.)	N	RI TYPE	10	(As a minimum, Record Location and Size of Recordable Indications as applicable)
		+	<u> </u>	A	SHALL STERS CREEKS & O.010" MDE
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33128 Lev.					
<b>J</b> J{ 240				2	GREASE STANIS ON CARS AND BETTERING PLATES
			н		
			Л		GROOT PATCH WITH MUMERCUS CRACKS \$ 0.010" MDS, TREWOUSLY RECORDED
	Ni - No Indicatio		Results	Leger	MDS , TREWOUSLY RECORDED
	Ni - No indicatio	ns Reco	Results Ri - Recorda	Leger ble inc	MDG , Remarkey Xecondae
A. Cracks (Characte		Reca Settle	Results Ri - Recorda ordable Indic ments Or De	Leger ble Inc ation 1	MDG , Reways Ly XetoRbac
B. Exposed Reinford	erize and Size) G. cing Steel H.	Reco Settle Degra	Results Ri - Recorda ordable Indic ments Or De ided Patches	Leger ble Inc ation 1 flectio	MDE , Reward Ly XetoRbac
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<ul> <li>Exposed Reinford</li> <li>Exposed Metallic</li> <li>Evidence Of Great</li> <li>Evidence Of Mois</li> </ul>	erize and Size) G. cing Steel H. : Items (Other) I ase Leakage J sture K.	Reca Settle Degra Popou Spalls Cold	Results Ri - Recorda ordable Indic ments Or De ided Patches uts , Voids, H loint Lines	Leger ble Inc ation 1 flectio or Re loneyc	MDef       According of the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second seco
<ul> <li>B. Exposed Reinford</li> <li>C. Exposed Metallic</li> <li>D. Evidence Of Grad</li> <li>E. Evidence Of Mois</li> <li>E. Leaching Or Cheil</li> </ul>	erize and Size) G. cing Steel H. : Items (Other) I ase Leakage J sture K. mical Attack L.	Reca Settle Degra Popou Spalls Cold J Corros	Results Ri - Recorda ordable Indic ments Or De ided Patches uts , Voids, H ident Lines sion Staining	Leger ble Inc ation 1 flectio or Re loneyc	Intervals (y XetoRbac)         Id:
<ul> <li>B. Exposed Reinford</li> <li>C. Exposed Metallic</li> <li>D. Evidence Of Grad</li> <li>E. Evidence Of Mois</li> <li>E. Leaching Or Cheil</li> </ul>	erize and Size) G. cing Steel H. : Items (Other) I ase Leakage J sture K. mical Attack L. ation : TYes TNo	Reca Settle Degra Popou Spalls Cold J Corros	Results Ri - Recorda ordable Indic ments Or De ided Patches uts , Voids, H ident Lines sion Staining Skatch	Leger ble Inc ation 1 flectio or Re loneyc	Interview Cy XetoRbac         Id:         lication !O - Information Only         ype Codes:         ns       M. Scaling / Dusting         pairs       N. Coating Deterioration         omb       O. Abrasion, Cavitation, Wear         P. Air Voids / Bug Holes       O. Efflorescence         R. Other (Explain )       Other (Describe):
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B. Exposed Reinford C. Exposed Metallic D. Evidence Of Great E. Evidence Of Mois F. Leaching Or Che Supplemental Inform EXAMINER/EVALL Print & Sign)	erize and Size) G. cing Steel H. : Items (Other) I ase Leakage J sture K. mical Attack L. ation : Yes No Re JATOR	Reco Settle Degra Popou Spalls Cold J Corros	Results Ri - Recorda ordable Indic ments Or De ided Patches uts , Voids, H ident Lines sion Staining Skatch	Leger ble Inc ation 1 flectio or Re loneyc	and:         lication !O - information Only         ype Codes:         ns       M. Scaling / Dusting         pairs       N. Coating Deterioration         omb       O Abrasion, Cavitation, Wear         P. Air Voids / Bug Holes       Q. Efflorescence         R. Other (Explain )       Uvideo Other (Describe):         Yes       No
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B. Exposed Reinford C. Exposed Metallic D. Evidence Of Great E. Evidence Of Mois E. Leaching Or Che Supplemental Inform EXAMINER/EVALL Print & Sign) STATION/ADMIN F Print & Sign) This section RI or Unacceptable Additional Actions:	erize and Size) G. cing Steel H. Hems (Other) I ase Leakage J sture K. mical Attack L. ation : Yes No REVIEW Even Sciences to be completed or	Reca Settle Degra Popou Spalls Cold J Corros Suits	Results Ri - Recorda ordable Indic ments Or De ided Patches uts , Voids, H Joint Lines Skatch F Acceptable Examiner/ //es N	Leger ble Inc ation 1 ifiectio s ar Re coneyco Photo <b>D</b> <b>D</b> <b>D</b> <b>D</b> <b>D</b> <b>D</b> <b>D</b> <b>D</b> <b>D</b> <b>D</b>	Image: Additional and the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second st
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Revision 5 Page 32 of 32

.

Station: TMI	Unit: 1		Date: /	2-18-0	report No:
System: N/A	Component:	4			WO No(s) .: R215426
	ng: Communeur	Elev.	05-380	Col.:	
		TVI	3C Type	Of Exa	m: Direct XRemote Matl. Type
Design Drawing(s	فكالنا الأكر المادية والترافية أأتسم والهيهي فالتكاف ويهجها		Visua		BADGULARS
Surface: ID	Ð				mponents Coated: YES NO
M&TE Used		Test Ca			al No. appassiance Cal. Due Date:
Illumination Used			1	luminat	ion Verified: Date: 12-18-09 Time:
Special / Specific		N/A	DECU	TO	
	Item Number and cription	t.	RESUL		Explanation / Notes (As a minimum, Record Location and Size o
	I, EID, etc.)				Recordable Indications as applicable)
TUREWE BID. M				A	STALL STRATS CRACKS & 0.010" - Da
305 ELV. TO 380				P	SMALL BUGARLES
				2	GREASE STANS ON CAPS AND BEARING PLATES
					SUACTIVE
				2	Asmuments & avanatales
	an an an an an an an an an an an an an a	l	Res	ilts Leger	
	Ni - No Inc		Ri - Recor	rdable Inc	dication 10 - Information Only
A Charles (Chornel	ning and Sizel		ecordable Ind tilements Or		
A. Cracks (Characte B Exposed Reinfor			graded Patch		
C. Exposed Metallic	: Items (Other)	I. Po	outs Voids		omb O Abrasion, Cavitation, Wear
D. Evidence Of Gre		J. Spa			P Air Voids / Bug Holes
<ul> <li>E Evidence Of Mois</li> <li>F. Leaching Or Che</li> </ul>			d Joint Lines rosion Staini		Q. Efflorescence R. Other (Explain)
Supplemental Inform			] Sketch	]Photo	☐Video ☐ Other (Describe):
ouppentental monin		and the second second second second second second second second second second second second second second second	s. Acceptabl		
EXAMINER/EVALU	JATOR		0-1	Nor	1
(Print & Sign)	Daniel	P.O.Snee	Kiter !!	Ca	LEVEL TO DATE 12
STATION/ADMIN F	REVIEW	-17	(~~	$\sim$	DATE 2/1/2010
(Print & Sign)	Clur	Johnsi			
	-	-		-	uator notes RI or Unacceptable condition
			Yes 🗌	No	
RI or Unacceptable Additional Actions:	rasults Accepta	DIG Q		,,,,	

Revision 5 Page 32 of 32

## ATTACHMENT 6

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Bage 1 of 1

		۲۲	age 1 or	1			
Station: TMJ	Unit: 🗶	D	ate: 12 - 16.	-01	Repo	rt No:	
System: -/.+	Component: ~//~				WO M	No(s).: K2154	165
Location: Buil	ding: Communer Ele	ev.: 295 -	JJ Col	. HA	Row: MA	Azimuth/Rad	lius; "
Exam Type:	DV GV VT-1C	VT-3C	Type Of Ex	am: Direc	t XRemote	Matl. Type	
Design Drawing				BADGUCARS		manness and the second	
	$\sigma$			omponents	Coated: 7	ES NO	
M&TE Used	Heres 7 Tes	t Card	UTC or Ser	ial No.0002	51.273	Cal. Due Dat	e:5-11-1
Illumination Use	d FLASHLIGHT	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Illumina	ation Verified	I: Date: AT-/		e: 3 :0
Special / Specifi							
Component	/ Item Number and	R	ESULTS			ation / Notes	
	escription	NIF	RI TYPE 10			ocation and Siz	e of
(e.g. E	IN, EID, etc.)				le Indications a		
Isrenney are	Rin Fand		A	Same Sta	ess Canes	0.010° wspe-	
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			8	Acarperis	D 12" ANCHOR	MALEX	·····
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	NI - No Indicatio	vos Ri-	Results Leg		- Information Only	,	
		Record	ble Indication	Type Codes			
	cterize and Size) G.		nts Or Deflect		M. Scaling / E		
<ol><li>Exposed Reinf</li></ol>			d Patches or F			eterioration	
	lic Items (Other) I.		Voids, Honey	ycomb		Cavitation, Wear	
	rease Leakage J.	Spails			P Air Voids / Q Efflorescer		
E. Evidence Of M F. Leaching Or Cl		Cold Join	n Staining		Q Efflorescer R Other (Exp		
	mation : Yes No		tch Phot		Other (Desc		
Supplemental mul		esuits. Ac		the second second second second second second second second second second second second second second second s	No	noe;.	
EXAMINER/EVA	LIATOR	~	7 11	4			
Print & Sign)	Dawes P.O'S	n He	APOs	han L	EVEL 7	DATE	2-10-
STATION/ADMIN		- 1	(				
Print & Sign)	Evan	Johnson	$\sim w$		DA	TE 2/1/20	10
This sectio	n to be completed or	nly if Exa	aminer/Eva	luator note	s RI or Unaco	ceptable cond	ition.
	le results Acceptable	T Yes					
•	io i coorto i locoptable	<u>د</u> ، ده					
Additional Actions:	Dentare factore Decent and Station		dive Active				
	Order, Issue Report, etc. initiate	1 2					
EVEL III or RE R	REVIEW (as applicable)	No.22	<u> </u>	WORD T. A	<u>((; (; 6.)</u> DA	TE: 16 FEB 1	0
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		TTACHM		-
ASME IWE (Class CC) Containm	ent	Concrete Repor		C or VT-3C Visual Examination NDE
		Page 1 o		1
Station: TMI Unit: 1		Date: /2-/8		Report No:
System: Component:			****	WO No(s): #203 43 43
Location: Building: Containment Elev	1:28	7 C	ol.: A	V/A Row: N/A Azimuth/Radius:
Exam Type: DV GV VT-1C XV	T-3C	Type Of	Exan	n: Direct Remote Matl. Type: Coverant
Design Drawing(s)				MOCULARS
Surface: ID OD				nponents Coated: 🔲 YES 🗹 NO
M&TE Used: LionT Meren Test	Card	UTC or S	Serial	No.0002552272 Cal. Due Date: 5-14/4
Illumination Used FLASHLIGHT		illum	ninatio	on Verified: Date: 12-18-09 Time: 5100 PM
Special / Specific Instructions: N/A				
Component / Item Number and		RESULTS		Explanation / Notes
Description (e.g. EIN, EID, etc.)	NI	RI TYPE	10	(As a minimum, Record Location and Size of Recordable Indications as applicable)
ELV 291 INTERMEDIATO BUD.			7	SAAL BUDNOLES
(ALIGATOR PIT)			A	STRESS CRACKS (0.010 WIDE
		A,D		PASSIVE CRACKS WITH OIL LEARNAGE, ALTINE
		.7		SPALL AROUND FORM THE MOLES,
		v		312 x 2 14 x 14 DEEP
				. I
		Results		A
NI - No Indication	1S			lication IO - Information Only
	Reco	ordable Indica	tion T	ype Codes:
A. Cracks (Characterize and Size) G. B. Exposed Reinforcing Steel H		ments Or Def		
		ded Patches its , Voids, Ho		
	Spalls			P Air Voids / Bug Holes
		oint Lines		Q. Efflorescence
		sion Staining	In	R. Other (Explain)
Supplemental Information Yes No		ketch Pl Acceptable		∐Video ☐ Other (Describe): ]Yes ☐No
EXAMINER/EVALUATOR	341:13.	Acceptable	0	
(Print & Sign)	Sug	KLEU	UH	LEVEL I DATE 12-18-09
STATIONIADMIN DEVIENA	-1	<u>с</u>		
(Print & Sign)	702	$\sim ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~$		DATE 2/1/2010
				ator notes RI or Unacceptable condition.
RI or Unacceptable results Acceptable	ØY	′es []No	0	
Additional Actions:				
Action Request, Work Order, Issue Report. etc. initiated		The Action	2.1	
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ANII REVIEW (as applicable)				DATE:

Page ____ of ____

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Revision 5 Page 32 of 32

## ATTACHMENT 6

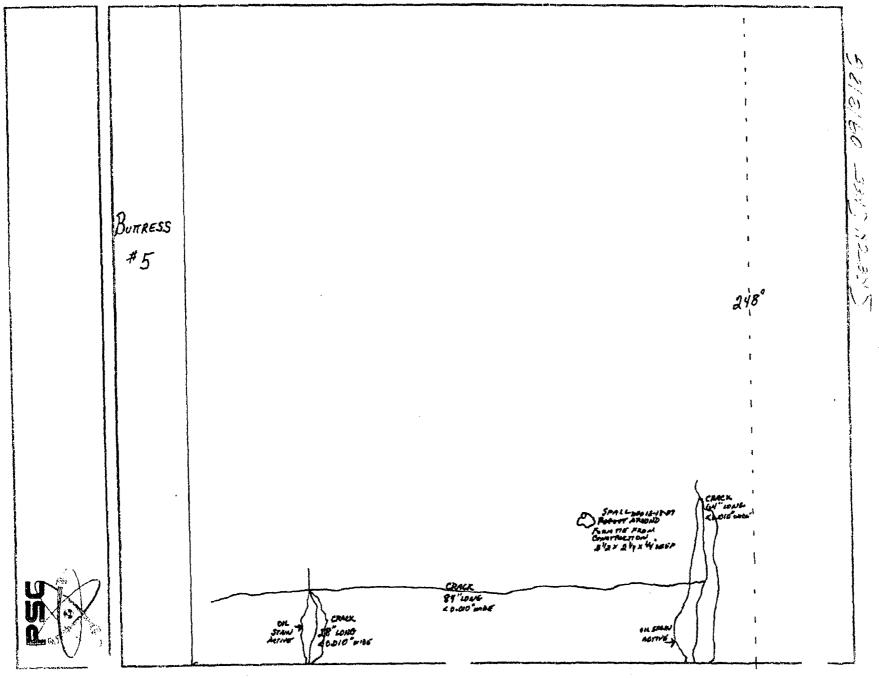
ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1

			rayer				
Station: TMJ	Unit: 1		Date: 12-12	7-09	Re	port No:	
System: AA	Component: "				WC	) No(s) .: 22154245	-
Location: Buildi	ng:Corrainment E	Elev.: 1	<b>\$</b> / (	Col.: NA	Row: N/A	Azimuth/Radius:	
Exam Type: [] D	J GV XVT-1C	7VT-30	Type Of	Exam: 🔀	Direct Remot	te Matl. Type:conci	err
Design Drawing(s	The second second second second second second second second second second second second second second second s		Visual A				
Surface: ID	(OD)		the second second second second second second second second second second second second second second second s		ents Coated:	YES X NO	
M&TE Used	Ter Gauss X Te	est Card	UTC or	Serial No.	674	Cal. Due Date:	10
Illumination Used	FLASHLIGHT"			ination Ve			
Special / Specific						ar	
Component / I	tem Number and	1	RESULTS		Expla	anation / Notes	
	cription	NI	RITYPE			d Location and Size of	1
	I, EID, etc.)			Rec	ordable Indications	as applicable)	
ELV. 281			A/D	ONEC	7ACK(PASUVA), <b>24</b>	LONG LO. 010 WIDE ,	
(AUGATOR PIT			.,	PARC	MACK (PASSING), 64	LONG & O.DIO WINE	
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Cracks (Characte	rize and Size) G.		ments Or Def			/ Dusting	
. Exposed Reinford			ided Patches			Detenoration	
Exposed Metallic			ts , Voids, Ho			n, Cavitation, Wear	
Evidence Of Great Evidence Of Mois						s / Bug Holes	
Evidence Of Mois Leaching Or Che			loint Lines sion Staining		Q. Effloreso R. Other (E		
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			Acceptable	Yes	No		1
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TM-N1043-500: Appendix H, Revision 0, Page 30 of 62

Revision 5 Page 32 of 32

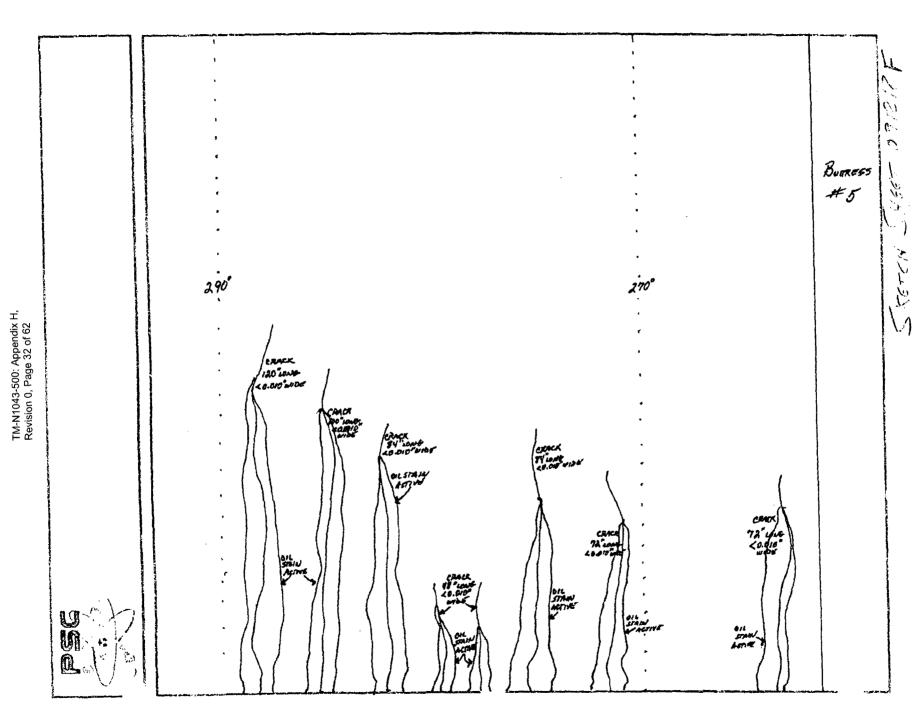
#### ATTACHMENT 6

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1

	rage	1011		
Station: THI Unit: 1	Date: 🗸	2-18-09	Rep	ort No:
System: -/A Component: -/A	<b>F</b>		WO	No(s): Rak5+245
Location: Building: Containment	Elev.: 28/	Col.: N/A	Row: 4/4	Azimuth/Radius:
Exam Type: DV GV XVT-1C	□VT-3C Type	Of Exam:	Direct Remote	e Matl. Type:concre
Design Drawing(s)	Visua	I Aids: N/A		
Surface: ID OD	Surfa	ce / Comp	oonents Coated:	YES NO
			NO. 574	Cal. Due Date:
Illumination Used FLATALLANT		lumination	Verified: Date: 4	18-09 Time: 5:00.
Special / Specific Instructions: N/				
Component / Item Number and	RESUL		•	hation / Notes
Description (e.g. EIN, EID, etc.)	NI RITYF		As a minimum, Record Recordable Indications	
ELV. 281	A,D		HALL IZD"LON	
(ALGATOR P.T)		3	STINE CRACK 100 "LONG ,	40.010 " 4. A.
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		R	SSIVE CRACK SY LOVE,	COID WIDE
		現	STINS CRACK TS LONG,	.010 MAG
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	Resul	ilts Legend:		
NI - No India			ation 10 - Information Or	ly
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C. Exposed Metallic Items (Other)				, Cavitation, Wear
D Evidence Of Grease Leakage J				/ Bug Holes
E. Evidence Of Moisture			Q. Efforesco	
F. Leaching Or Chemical Attack L	Corrosion Staini	00	R. Other (E)	plain )
				cribol
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Supplemental Information : XYes N	o X Skatch [ Results. Acceptabl	]Photo [	□Video □ Other (Des ′es □No	cribe):
Supplemental Information : 2 Yes N EXAMINER/EVALUATOR	o 🌋 🔀 Skətch [	]Photo [	Video 🗌 Other (Des	cribe): DATE 12-78-
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Page ____ of ____

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#### ATTACHMENT 6

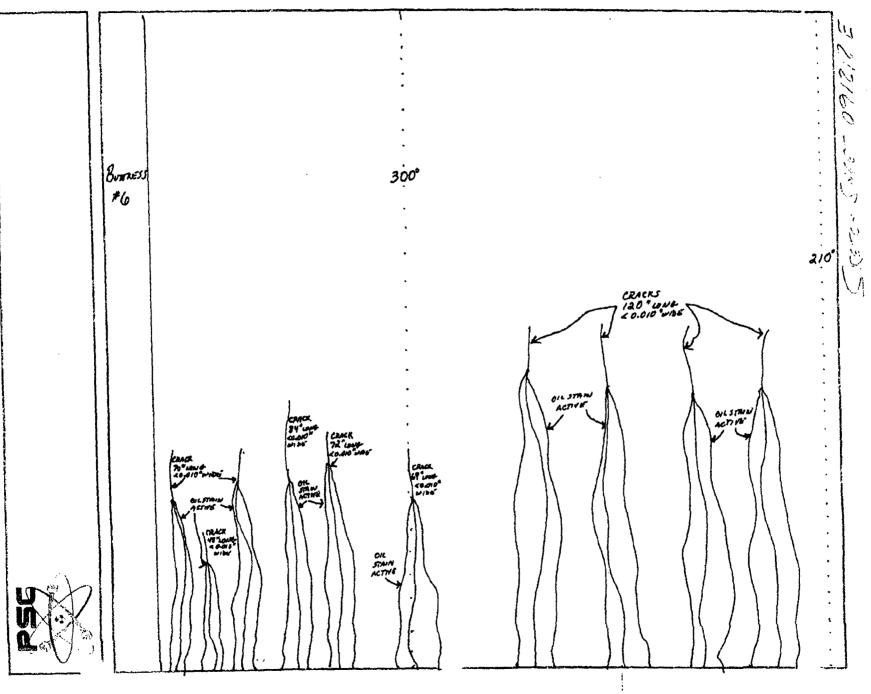
ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1

			Page 1	<u>or 1</u>		
Station: THI	Unit: 1		Date:/#-/	8-09	Repor	t No:
System: -// C	omporient: ~/A-				WO N	0(s): 23/5426 5
		ور: ۷			IA Row: NA	Azimuth/Radius:
	GV XVT-1C				n: Direct Remote	Mati. Type:concer
Design Drawing(s)			Visual A			Man. Type.concurr
Surface: ID	(OD)		Surface	/ Cor	nponents Coated: 🔲 Y	ES 🗶 NO
M&TE Used: Force	Test	Card			No. 000 8552272	Cal. Due Date:
Illumination Used A	ASPLIONT		lilun	ninati	on Verified: Date:	of Time: Sige )
Special / Specific Ins		····				
Component / Iten Descrip			RESULTS	10	Explana As a minimum, Record Lo	tion / Notes
(e.g. EIN, E		N	RITYPE	10	Recordable Indications as	
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(ALLENATOR PT)					PARTITE CRACE 48"LOND, C.	ovo "wiber
Bur. " le 10 210°					PASSING CRACK TO LOANS, &	
NUT. C IV CIU					PATATA CEACK SY LOUR, ~	anowing
					PATING CRACK T& LOOG, <	BOID WIN
					FOUR PROSINE CRACKS 120	"LONG CD. OLD
					ALL CRACKS SHOW ALTIN	WIL LOAK AGA
		L	Results	0000	d;	
	Ni - No Indicatio	ns			cation IO - Information Only	
			ordable Indica			<u>,</u>
<ul> <li>A. Cracks (Characterize</li> <li>B. Exposed Reinforcing</li> </ul>			ments Or Def ided Patches			
C Exposed Metallic Ite			uts, Voids, Ho			avitation, Wear
D Evidence Of Grease	Leakage J.	Spalls	i	•	P. Air Voids / B	Bug Holes
E. Evidence Of Moistur		Cold.	Ioint Lines		Q Efflorescen	
F. Leaching Or Chemic	al Attack L		sion Staining Skatch	hata	R. Other (Expl	
Supplemental Information					VideoOther (Descr ¶YesNo	
EXAMINER/EVALUA	TOR .		n. nh	<u> </u>		
Print & Sign)	DANKEL 2.0'S	use f	Hanf I'l	th	LEVEL I	DATE 12-12-02
STATION/ADMIN RE	VIEW FURT	102	nsm [°] (	~		TE 2/1/2010
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RI or Unacceptable re Additional Actions:	sults Acceptable	শ্র		)	MARD THILL, PE) DAT	TE: 16 Fag 10

Page ____ of ____

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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

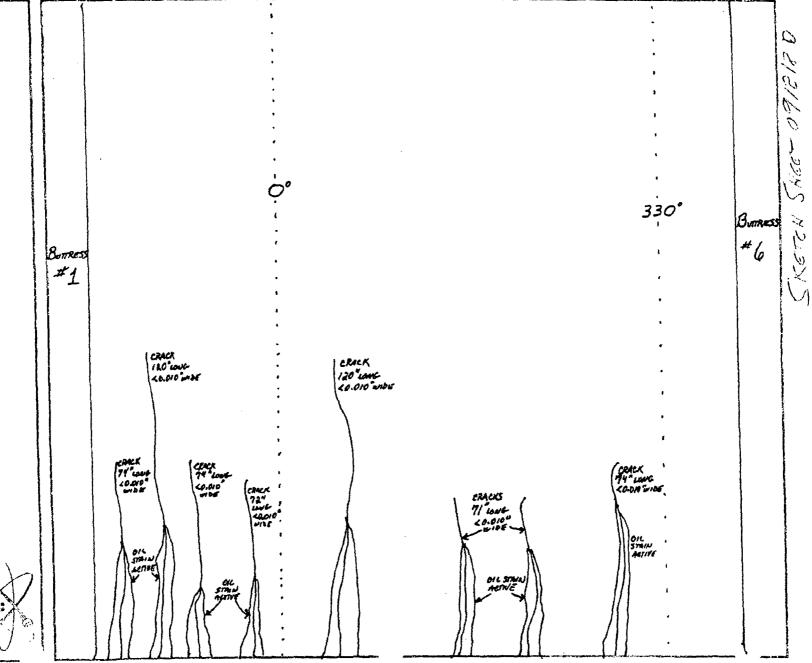
			<u> </u>	age i o				
Station: TH	r L	Init: <b>1</b>	Da	te:/2-/8-	09	Repo	ort Na:	
System: MA	Compone	ent: ,,,4-				WO	No(s): 2215-426	5-
	Building: Contained		251	Co	ol.: N/A	Row: N/A	Azimuth/Radius:	
Exam Type:	the second second second second second second second second second second second second second second second s				xam: 🛛 Di			
Design Draw				visual Aid			Maa. Type.com	CKG /
Surface:					Componen	ts Coated:	YES K NO	
M&TE Used:		x Test (	Card L	ITC or Se	erial No.	2452272	Cal. Due Date:	1-10
Illumination L	lsed ELASPHEAT				nation Veril			- distantion
	cific Instruction						**************************************	
Compon	ent / Item Numbe	ir and	RE	SULTS		Explan	ation / Notes	
	Description		NI RI	TYPE			Location and Size of	!
	I. EIN, EID, etc.)				Record	able Indications a	is applicable)	
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BUTT. TO	To Ext.#1					CRACK 72 LOUR,		
		ĺ		[		FRACK 74 "LANG ,		1
						cance 120 " como,		İ
				}	PASTING	GRACK 74" Lours ;		
					ALL CON	CAS SNOW ACTI	VE OIL LUARAGE	
				. <u> </u>				
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	141-	NO MOICEUON	and the second data was not second data was not second data was not second data was not second data was not se		on Type Code		Y	
A. Cracks (Ch	aracterize and Size	e) G. S		ts Or Defle		M. Scaling / [	Dusting	
	einforcing Steel			Patches or			eterioration	
	etallic Items (Other If Grease Leakage		Popouts .	Voids, Hon	eycomb		Cavitation, Wear	
E, Evidence C			Sold Joint	Lines		Q. Effloresce		
	r Chemical Attack		Corrosion			R. Other (Exp		
	nformation : 🗹	es 🗌 No 🗡	K Sketo	h Pho	oto 🗍 Vide	eo 📋 Other (Desc		-
		Res	ults. Acce	eptable	Yes	[]No		
EXAMINER/E	VALUATOR	) Para	15	2- PP E	14			-1-
Print & Sign)		DANIE 7.0'Su	ap Ala	<u> </u>	the _	LEVEL Z	DATE 122	10
STATION/ADN Print & Sign)	AIN REVIEW	Event	mento	(		DA	TE Q/1/2010	
	tion to be con	a the second second second second second second second second second second second second second second second	v if Eva	miner/Ex	aluator or		ceptable condition	
	table results Ac		Y II EXA X Yes		aiuatur fit		ceptable contritio	"
•		cehignia	ed ies					
Additional Action		ut ole initialad	for Comon	iva Artioni				
Antina Denunet LRG								- <b>-</b>
Action Request, Wo		-		بسسيندر	1.1	- 16 plan	- 1/ Carla	
	E REVIEW (as a)	-		2	Hower	This (S) DA	TE: 16 FEB 10	_

Page ____ of ____

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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

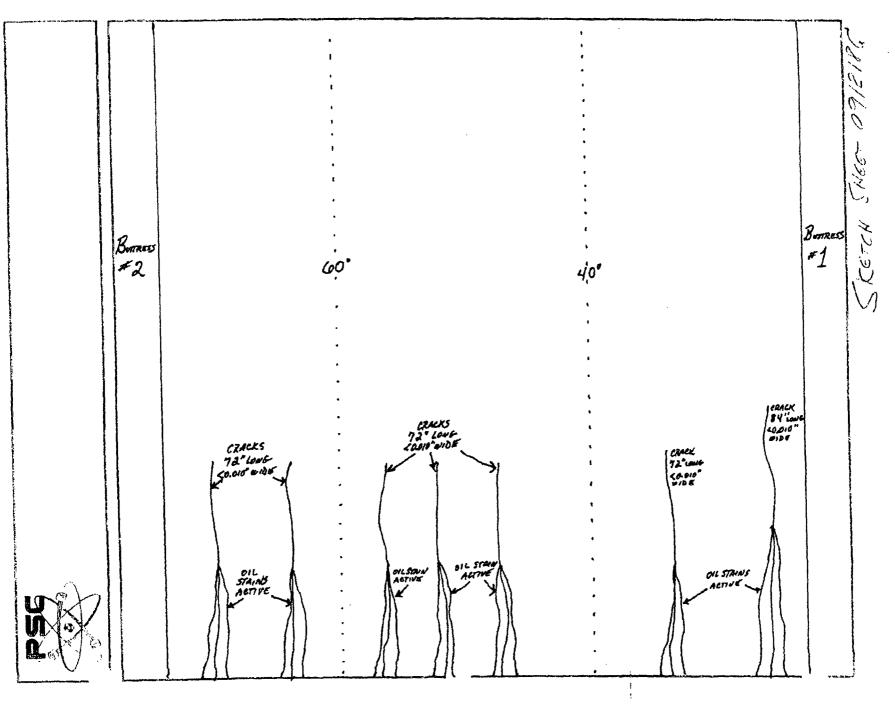
and a log of the second second second second second second second second second second second second second se	Page 1 of 1	
Station: THI Unit: 1	Date: 12-18-0;	9 Report No:
System: JA Component: JA		WO No(s) .: R2154265
Location: Building: Correspondent Elev	v.: 28/ Col.:	n/a Row: n/a Azimuth/Radius:
Exam Type: DV DV XVT-1C V	T-3C Type Of Exa	m: Direct Remote Matl. Type:concreter
Design Drawing(s)	Visual Aids:	
Surface: ID OD		mponents Coated: YES V NO
M&TE Used For Gruss X Test		al No. 600 ASS 2372 Cal. Due Date: 11-0
Illumination Used Farment	Illuminat	ion Verified: Date: 12-18-09 Time: 5-00 Pw
Special / Specific Instructions:	RESULTS	Europetice / Notice
Component / Item Number and Description	NI RITYPE 10	Explanation / Notes (As a minimum, Record Location and Size of
(e.g. EIN, EID, etc.)		Recordable Indications as applicable)
BLV. 281	A, D	PASSIVE CRACK SY "LOWS, < 0.000" WIDS
(ALIGATOR FIT)		SIX RASSIVE CHALKS The was <0.010 WIDE
But. * 1 to Bot. * 2		
NI - No Indication	Results Leger	id: dication 10 - Information Only
	Recordable Indication T	
	Settlements Or Deflection	
	Degraded Patches or Re Popouts , Voids, Honeyo	
	Spalls	P. Air Voids / Bug Holes
E. Evidence Of Moisture K.	Cold Joint Lines	Q. Efflorescence
	Corrosion Staining	R. Other (Explain )
Supplemental Information : 😰 Yes 🔲 No 🐣		
EYAMINER/EVALUATOR	ANGY'A	
Print & Sign) Danuer, P.O'S-	after 1. Other	LEVEL T DATE 12-18-02
STATION/ADMIN REVIEW EVENJ	ohnon C-	DATE 2/1/2010
	lv if Examiner/Evalu	uator notes RI or Unacceptable condition.
Ri or Unacceptable results Acceptable	K Yes ∏No	
Additional Actions:	والمراجع والمراجع والمراجع	
Action Request, Work Order, Issue Report, etc. initiated	for Corrective Action)	
EVEL III or RE REVIEW (as applicable)	and il	MURO T. HILL, P.S.) DATE: 16 FEB 10
ANII REVIEW (as applicable)		DATE:

Page ____ of ____

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Page 32 of 32

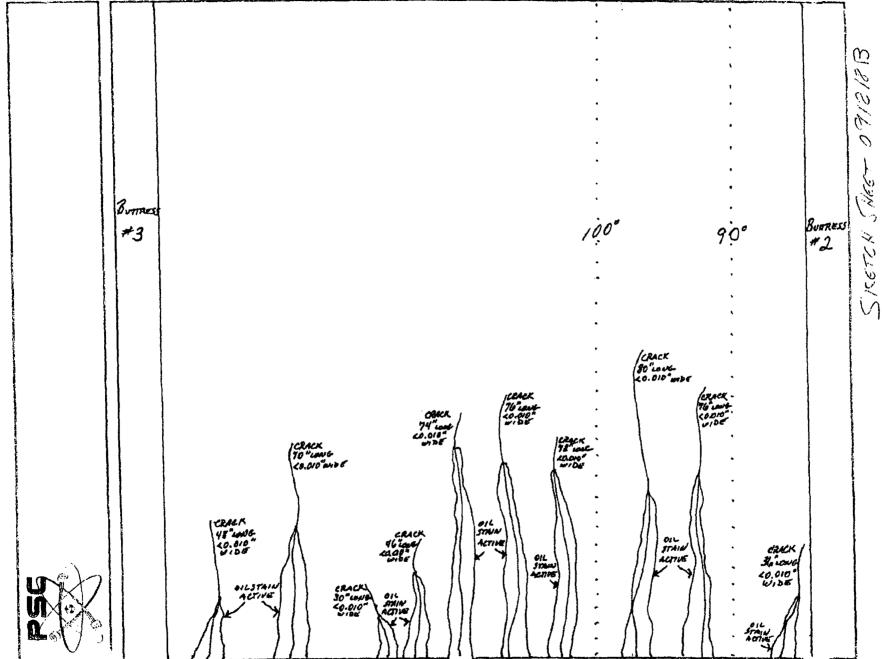
## ATTACHMENT 6

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report Page 1 of 1

	Page 1 of 1	
Station: 774.I Unit: 1	Date: 12-18-09	Report No:
System: 4/4 Component: 4/4		WO No(s).: 22154245
Location: Building: Communant Ele	v.: 28/ Col.: N/A	Row: n/A Azimuth/Radius:
Exam Type: DV GV XVT-1C V	T-3C Type Of Exam:	Direct Remote Matl. Type:concre re
Design Drawing(s)	Visual Aids: A/A	
Surface: ID OD	Surface / Compo	onents Coated: 🔲 YES 🔀 NO
M&TE Used: Frank Game X Test	And the second second second second second second second second second second second second second second second	
Illumination Used FLAGALLANT	Illumination	Verified: Date: 12-19-09 Time: 5100
Special / Specific Instructions: N/A		Further stime ( Mater
Component / Item Number and Description	RESULTS	Explanation / Notes As a minimum, Record Location and Size of
(e.g. EIN, EID, etc.)		ecordable Indications as applicable)
ELV. 281	A,D A	SING CAME SOM LONG, CO.010" WIDE
		RING FRACK 76" LONG, 40.010"WIDE" RING CRACK 80" LONG, 40.010"WIDE
(AUGATER PT) But."2 TO BUT"3		REVA CRICK Y'S LONG, CODIO" DE
BUTT. 2 TO BUT 3		SINE CRACK TO LOANT, 40.010 WIDD
		OWE CRACK TO CONG, LO.010" WINE
	2	53148 CRACK 46" 10 00 6 , «0.010" W 105 55148 CRACK 30 "court, < 0.018 "Widto"
	1745	DIVE CRACK TO LONG, & D.010" WIDE
	744	SINE CRACK 45"LOWAS & O.OIO" WIDE
	Au	CRACKS SNOW ACTIVE OIL LEAKAGE
المحالية عالم المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع ا	Results Legend:	
NI - No Indication	Recordable Indication Type	tion IO – Information Only
A. Cracks (Characterize and Size) G.	Settlements Or Deflections	M. Scaling / Dusting
	Degraded Patches or Repair	
	Popouts , Voids, Honeycomb Spalls	<ul> <li>O Abrasion, Cavitation, Wear</li> <li>P. Air Voigs / Bug Holes</li> </ul>
	Cold Joint Lines	Q. Efflorescence
	Corrosion Staining	R. Other (Explain )
Supplemental Information : 24 Yes No		Video U Other (Describe):
	sults. Acceptable	es 🔲 No
EXAMINER/EVALUATOR (Pmi & Sign)	Mail! Office	LEVEL TO DATE 12-15-08
STATION/ADMIN REVIEW		
(Print & Sign) Even Jo	hum b	DATE 2/1/2.10
This section to be completed on	ly if Examiner/Evaluate	or notes RI or Unacceptable condition.
RI or Unacceptable results Acceptable	🕅 Yes 🗌 No	
Additional Actions:		
(Action Request, Work Order, Issue Report, etc. initiated		
LEVEL III or RE REVIEW (as applicable)	when Hour	APAL PE. DATE 16 FEB 10
ANII REVIEW (as applicable)		DATE:

Page ____ of ____

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TM-N1043-500: Appendix H, Revision 0, Page 40 of 62

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

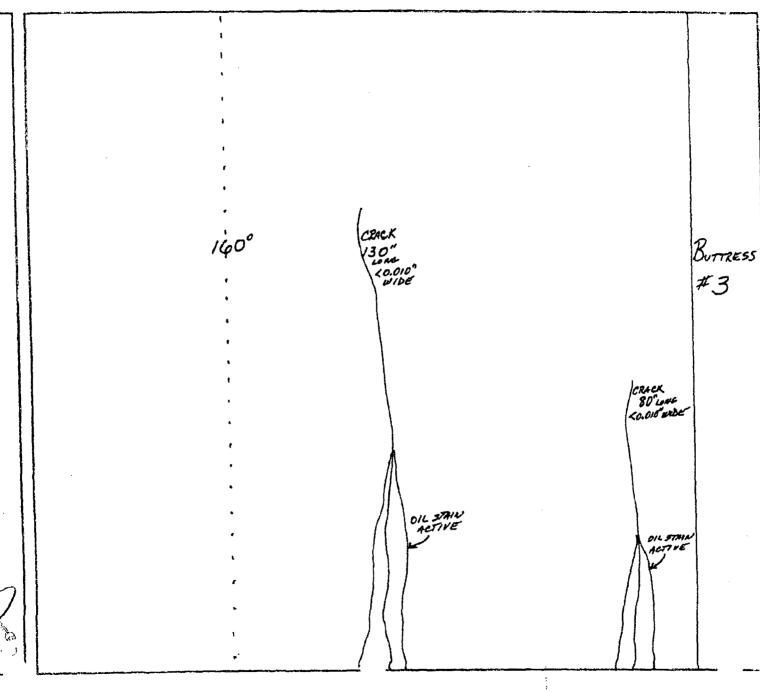
B. Exposed Reinforcing Steel       H. Degraded Patches or Repairs       N. Coating Deterioration         C. Exposed Metallic Items (Other)       I. Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         D. Evidence Of Grease Leakage       J. Spalls       P. Air Voids / Bug Holes         E. Evidence Of Moisture       K. Cold Joint Lines       Q. Efflorescence         F. Leaching Or Chemical Attack       L. Corrosion Staining       R. Other (Explain)         Supplemental Information : XIYes       No       Xetch         Results. Acceptable       Yes       No         EXAMINER/EVALUATOR       Manue RO'Snee       Manue RO'Snee         Print & Sign)       Manue RO'Snee       Corrosion Staining			Fage I ULI		
Location:       Building Correnament       Elev.: #P/       Col.:#A       Row:#A       Azimuth/Radius:         Exam Type:       DV       GV       GV       Type (1)       GV       Azimuth/Radius:         Exam Type:       DV       GV       GV       SUFace       Direct       Remote       Mat. Type concerve         Besign Drawing(s)       Surface / Components Coated:       YES       NO         Surface:       ID       Surface / Components Coated:       YES       NO         Matte Used / Surfacer       III Umination Venfied:       Date: / # / # / #       Cal. Due Date: / # / # / #         Special / Specific Instructions:       //A       //A       Explanation / Notes         Special / Specific Instructions:       //A       //A       Explanation / Notes         Component / Item Number and       RESULTS       Explanation / Notes       Explanation / Notes         Description       N       RITYPE IO       (As a minimum. Record Location and Size of Recordable Indication 100 - Information Chip       Recordable Indication 100 - Information Chip         Attractartize RFr/       A, D       Recordable Indication 100 - Information Chip       Recordable Indication 100 - Information Chip         Recordable Indication 100 - Information Chip       Recordable Indication 100 - Information Chip       Recordable Indicat	Station: TMI	Unit: 1	Date: 12-18-0	P Repo	ort No:
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Design Drawing(s)       Visual Aids: -44         Surface:       ID       ID         Surface:       ID       Image: Surface / Components Coated:       YES       NO         M&TE Used: / Surface:       Image: Surface / Components Coated:       YES       NO         M&TE Used: / Surface:       Image: Surface:       Image: Surface / Components Coated:       YES       NO         Specific Instructions:       A/A       Cal Due Date: / J/J* 0/P       Time: Sure / J       Surface / Components / Item Number and Description (e.g. EIN, EID, etc.)       NI       RITYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         ELV: & & CH, ED, etc.)       NI       RITYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         BLV: & & ST // (Alisarte RFr)       A, D       For // Components Coated:       Surface / Co. end* end*         B. Exposed Reinforcing Steel       Recordable Indication Type Codes:       NI - No Indication Recordable Indication 10 - Information Only       Recordable Indication Type Codes:         B. Exposed Reinforcing Steel       B. Degraded Pathes or Repairs       N. Coating Deteroration       A deteroration         C. Explore CM Grass Leagend:       Item Steel Pathes or Repairs       N. Coating Deteroration       A deteroration         B. Exposed Reinforcing Steel	Location: Building	Communeur Ele	IV.: 281 Col.	N/A Row:N/A	Azimuth/Radius:
Design Drawing(s)       Visual Aids: -44         Surface:       ID       ID         Surface:       ID       Image: Surface / Components Coated:       YES       NO         M&TE Used: / Surface:       Image: Surface / Components Coated:       YES       NO         M&TE Used: / Surface:       Image: Surface:       Image: Surface / Components Coated:       YES       NO         Specific Instructions:       A/A       Cal Due Date: / J/J* 0/P       Time: Sure / J       Surface / Components / Item Number and Description (e.g. EIN, EID, etc.)       NI       RITYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         ELV: & & CH, ED, etc.)       NI       RITYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         BLV: & & ST // (Alisarte RFr)       A, D       For // Components Coated:       Surface / Co. end* end*         B. Exposed Reinforcing Steel       Recordable Indication Type Codes:       NI - No Indication Recordable Indication 10 - Information Only       Recordable Indication Type Codes:         B. Exposed Reinforcing Steel       B. Degraded Pathes or Repairs       N. Coating Deteroration       A deteroration         C. Explore CM Grass Leagend:       Item Steel Pathes or Repairs       N. Coating Deteroration       A deteroration         B. Exposed Reinforcing Steel	Exam Type: DV	GV XVT-1C	/T-3C Type Of Exa	am: Direct Remote	Matl. Type:concreter
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M&TE Used:       UTC or Serial No. 00000000000000000000000000000000000		00)	Surface / Co	mponents Coated:	YES X NO
Illumination Verified: Date: J=19-09 Time: Res reg         Specific Instructions: A/A         Component / Item Number and Description (e.g. EIN, EID, etc.)         INI RESULTS (As a minimum, Record Location and Size of Recordable Indications as applicable)         ELV. 2.9.1         Recordable Indications as applicable)         ELV. 2.9.1         Recordable Indications as applicable)         Recordable Indications as applicable)         Recordable Indication ID - Information Only	M&TE Used				
Special / Specific Instructions:       n/A         Component / Item Number and Description (e.g. EIN, EID, etc.)       RESULTS       (As a minimum, Record Location and Size of Recordable Indications as applicable)         ELV: & & Y ( (ALLGATER, F)r.)       NI       RI TYPE       IO       (As a minimum, Record Location and Size of Recordable Indications as applicable)         ELV: & & Y ( (ALLGATER, F)r.)       A, D       Results Legend: There is a standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in the standard in	Illumination Used	ASBLID & T			ويرجع والمحادثة البارج أيتكمك فيتبين البست محدد والمحادث والمحادث والمحادث والمحادث والمحادث والمحاد
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(e.g. EIN, EID, etc.)       Recordable Indications as applicable) <i>ELV, d.S.I A, D Resolve cRAck, 80 "Lower, &lt;0.010" super lines (ALLGATER, Fir) ALLGATER, Fir) A, D Results cRAck, 80 "Lower, &lt;0.010" super lines (ALLGATER, Fir) Burn, ** 3 ro, 160" Results Legend: Results Legend:</i> Ni · No Indications       R1 - Recordable Indication 10 - Information Only         Recordable Indication Type Codes:       Settlements Or Deflections       M. Scaling / Dusting         B. Exposed Metalic Items (Other)       Popouts, Voids, Honeycomb       O. Abrasion, Cavitation, Wear         D. Evidence Of Moisture       K. Cold Joint Lines       Q. Efflorescence         E. Evidence Of Moisture       K. Cold Joint Lines       Q. Efflorescence         E. Evidence Of Moisture       K. Cold Joint Lines       Q. Efflorescence         E. Evidence Of Moisture       K. Cold Joint Lines       Q. Detr (Describe):         Results. Acceptable       Results. Acceptable       Date (2/1/2010)         Thit & Sign)       Evidence of the completed only if Examiner/Evaluator notes Ri or Unacceptable condition.       Not Corective Acceptable         Kerner & Sign)       Event Sign:       Event Sign:       Not Kerner Size Report, etc. initiated for Corrective Action).         Kothinel Repuest, Vok Order, Issue Report, etc. initiated for Correcti			RESULTS	Explan	ation / Notes
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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

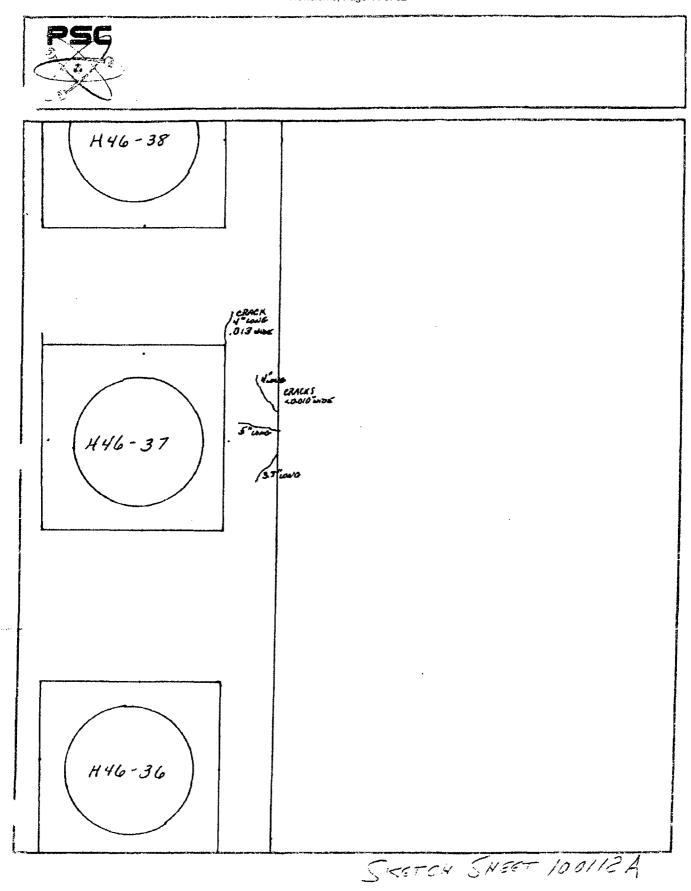
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TM-N1043-500: Appendix H, Revision 0, Page 44 of 62



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### **ATTACHMENT 6**

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE

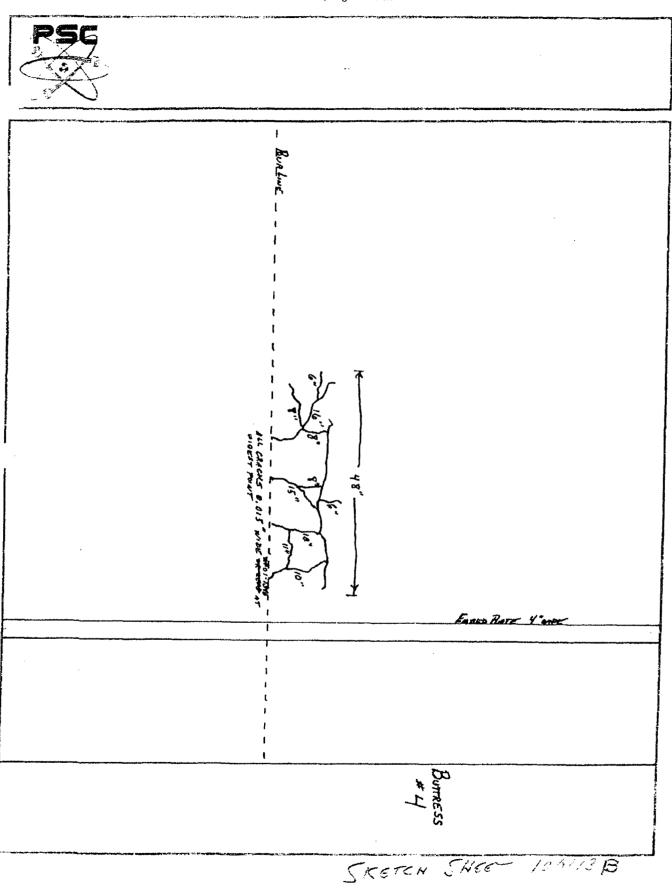
Report Page 1 of 1

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ER-AA-335-018 Revision 5

Page 32 of 32

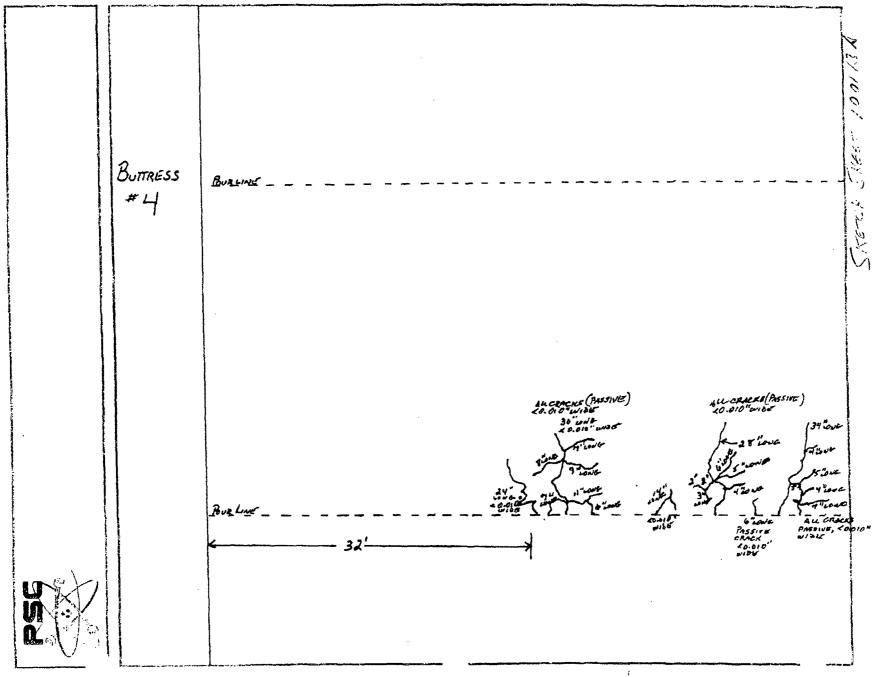
ATTACHMENT 6 CC) Containment Concrete VT-1C or VT-3C Visual Exam

ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE

Report Page 1 of 1

| Station: 7/4 / Unit: 1 Date: 1-18-10 Report No: System: x/4 Component: x/A WO No(s): R215 4240 Location: Building: Converser Elev: Col. A/A Row: x/A Azimuth/Radius: Exam Type: DV GV ZVT-1C_UVT-3C Type Of Exam: ZDirect Remote Matt. Type Guicerrer Design Drawing(s) Visual Alds: x/A Surface: D Surface: Components Coated: YES Surface: 10 DD Surface / Components Coated: YES NO M&TE Lusct: x/Mark Test Card UTC or Serial No. 9245/974778 Cal. Due Date: 1/55.9 Time: riso r Illumination Used Fest Card UTC or Serial No. 9445/974778 Cal. Due Date: 1/55.9 Time: riso r Special / Specific Instructions: A/A Resolution Verified: Date: r/10.9 Time: riso r Seriessity Sim: 3 + 4 A Cars a none Comparison as applicable Bestruetsy Sim: 7.9 + 4 A Cars a none Comparison only Recordable Indication 10 - Information Only A Cracks (Characterize and Size) G. Settlements of Defections M. Scaling Jousting Bestruetsy Sim: 7.9 + 4 A Cars a none Construet only | | | | | | |
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| Surface: ID Surface / Components Coated: IVES INO M&TE Used: ITest Card UTC or Serial No. YES INO M&TE Used: Factorization Itest Card UTC or Serial No. YES Ino Special / Specific Instructions: /// /// Cat. Due Date: Time: /// Time: /// Time: /// Time: /// /// Time: /// Time: /// Time: /// /// Time: Time: /// Time: /// Time: Time: Time: Time: Time: Time: Time: Time: Time: | | | | | | |
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TM-N1043-500: Appendix H, Revision 0, Page 48 of 62

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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

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|--|--|----------------|---|--|---|
| Station: THI Unit: 1 | | Date: 1-/9 | -10 | Report No: | |
| System: N/A Component: N/A | | | | WO No(s) .: 22154265 | |
| Location: Building Commune Elev | 1.: | С | lol.: 🍂 | A Row: 4/A Azimuth/Radius: | |
| Exam Type: DV GV XVT-1C V | T-3C | Type Of I | Exan | : Direct Remote Matl. Type: Coveren | 2 |
| Design Drawing(s) | | Visual Ai | | | |
| Surface: ID COD | | | to an a state of the second second second second second second second second second second second second second | ponents Coated: YES XNO | |
| M&TE Used: Test | Card | UTC or S | and the second second | | 7 |
| Illumination Used Francism | | llum | inatio | on Verified: Date: /-/9-10 Time: /:00 | |
| Special / Specific Instructions: N/A | | | | | |
| 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.) | <u> </u> | | | Recordable Indications as applicable) | |
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Revision 5 Page 32 of 32 ٦)

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: 1-19-10 Report No: WO No(s). System: NA-Component: NA Location: Building: Containment Elev .: COL: N/A ROW: N/A Azimuth/Radius: Exam Type: DV GV VT-1C XVT-3C Type Of Exam: Direct Remote Matl. Type: Covcesne Visual Aids: Smoculars Design Drawing(s) Surface / Components Coated: Surface: ID Œ YES X NO M&TE Used: Lawr Marce Test Card UTC or Serial No.0002552272 Cal. Due Date: 5-14/0 Illumination Used FLASHLIGAT Illumination Verified: Date: 1-11-10 Time: 1:00 page Special / Specific Instructions: NA RESULTS Component / Item Number and Explanation / Notes (As a minimum, Record Location and Size of Description **RI TYPE** 10 NI (e.g. EIN, EID, etc.) Recordable Indications as applicable) SAAL STRUSS CRACKS, < 0.010 "WIDE Dome AREA A. 01-11-1 SMALL SPALLS ALONG EDGE OF DAA, NAGE DAA J TRACK R RUSTY EMBERS SALLING ADDING HAD RAIC ENDERS - ALEVIAND J RECORDED Results Legend: RI - Recordable Indication IO - Information Only NI - No Indications Recordable Indication Type Codes: Settlements Or Deflections Scaling / Dusting Cracks (Characterize and Size) G M A 8. Exposed Reinforcing Steel H **Degraded Patches or Repairs** N Coating Deterioration Exposed Metallic Items (Other) Popouts , Voids, Honeycomb Abrasion, Cavitation, Wear C. ŧ 0 D. Spalls P. Air Voids / Bug Holes Evidence Of Grease Leakage j. Ε **Evidence Of Moisture** K. **Cold Joint Lines** a Efforescence Leaching Or Chemical Attack Corrosion Staining Other (Explain) R. Video Other (Describe) Supplemental Information : Yes No Skatch Photo Results. Acceptable **X**Yes **No** EXAMINER/EVALUATOR DANIEL P. O'SNEA LEVEL DATE 1-19-10 (Print & Sign) STATION/ADMIN REVIEW 2/1/2010 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 Additional Actions: Action Request, Work Order, Issue Report, etc. initiated for Corrective Action Harrison T. Mile, PS DATE: 16 Fee 10 LEVEL III of RE REVIEW (as applicable) DATE: ANII REVIEW (as applicable)

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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

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| Station: TMI | Unit: | 1 | | Date:/-/5~ | 10 | Report N | No: | |
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| Design Drawing(| | | | Visual Ai | | | | |
| Surface: IC | | | | | | ponents Coated: VES | S X NO | |
| M&TE Used: | LER GAILE | Test Ca | ard | UTC or S | Seria | No. 874 | Cal. Due Date: | |
| Illumination Used | FRACHLIGHT | | | lllum | inati | in Verified: Date:-13-10 | Time: #130 | AM |
| Special / Specific | | NIA | | | | | | |
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ER-AA-335-018 Revision 5

Page 32 of 32

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ATTACHMENT 6 ASME IWE (Class CC) Containment Concrete VT-1C or VT-3C Visual Examination NDE Report

| | | Page 1 c | <u>of 1</u> | | |
|---|--|--|-----------------------|---|----------|
| Station: TMI Unit: 1 | | Date: /-/- | 10 | Report No: | |
| System: w/4 Component: */4- | | | | WO No(s) .: R2154260 | |
| Location: Building: Communer Ele | v.: | c | ol.: A | A Row: 4/4 Azimuth/Radius: | |
| Exam Type: DV DV VT-1C V | /T-3C | Type Of | Exan | n: Direct Remote Matl. Type: Course | F |
| Design Drawing(s) | | Visual A | ids N | IA | |
| Surface: ID (DD) | | | | nponents Coated: 🛄 YES 🔀 NO | |
| THE COOL FELCA GALLE | Card | UTC or S | | | |
| Illumination Used FLASHLIGHT | | Illun | inati | on Verified: Date: 1-18-10 Time: #180 | |
| Special / Specific Instructions: N/A | | | | | |
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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: T/1 Unit 1 Date://3~/0 Report No: System: w//A Component: w//A WO No(s): RA/542/5 <sup></sup> Location: Building Curvaneer Elev.: Col. #A Row #/A AzimuthRadius: Exam Type: DV GV (BV (M)T-1C [VT-3C Type Of Exam (BDirect] Remote Mail. Type: Curcerr Design Drawing(s) Visual Aids/A Surface: ID O Surface / Components Coated:YES (R) NO Matte Used: Test Card UTC or Senal No. 399/67/3742 Cal. Due Date: 1275 Illumination Used Component / Item Number and RESULTS Explanation / Notes Component / Item Number and RESULTS Explanation / Notes Component / Item Number and RESULTS As a minimum, Record Location and Size of Recordable Indications as applicable) Accracks (Characterize and Size) Recordable Indication 10 - Information Cnty Recordable Indication 10 - Information Cnty Request A Retrieve A Recordable Indication 10 - Information Cnty Recordable Indication 10 - Information Viear Recordable Indication Size of Reports M. Scaling / Dusting Scaling / Dusting Recordable Indication Size of Reports M. Scaling / Dusting Recordable Indication 10 - Information Cnty Recordable Indication Size of Reports< | | rayeru | · · · · | |
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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

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| Location: Building Consumers Elev. Col. 44 Row. 4/4 Azimuth/Radius: Exam Type: OV GV GV T-1C VT-3C Type Of Exam: Direct Remote Matl. Type:Concerns Design Drawing(s) Visual Aids 3/4 Design Drawing(s) Visual Aids 3/4 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TE Used: Section 10 Components Coated: YES A NO M&TYPE IO Component (Inem Number and Description NI RITYPE IO Results Legend: NI - No indications Results Legend: NI - No indications Results Legend: NI - No indications Results Legend: NI - No indications Results Legend: NI - No indications RI - Recordable Indication IO - Information Cnty Recordable Indication Type Codes Code Section Tope Codes Code Sectin Code Sectin Code Section Re | Station: TH | r Uni | t: 1 | Date: 7-7. | 3-10 | | Repo | rt No: | | |
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| Print & Sign) DARMUL O'Skea filles for Construction LEVEL Z DATE 1-19-00 STATION/ADMIN REVIEW Examiner/Evaluator notes DATE 2/1/2010 This section to be completed only if Examiner/Evaluator notes RI or Unacceptable results Acceptable X Yes No RI or Unacceptable results Acceptable X Yes No Additional Actions: Action Request, Work Order, Issue Report, etc. initiated for Corrective Actions .EVEL III or RE REVIEW (as applicable) Date for Corrective Actions Howerd T. Hitcl, P.E. DATE:] / FEG / O | CYALING CO. | | nesu | a. noceptable | | | | | | |
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| Print & Sign) Examiner/Evaluator notes RI or Unacceptable condition. This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. RI or Unacceptable results Acceptable Additional Actions: Action Request, Work Order, Issue Report, etc. initiated for Corrective Action: EVEL III or RE REVIEW (as applicable) Action Request, Work Order, Issue Report, etc. initiated for Corrective Action: EVEL III or RE REVIEW (as applicable) | STATIONADM | | - | | | | | | | |
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Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action
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| RI or Unacceptable results Acceptable RI Yes DNo
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Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action
EVEL III or RE REVIEW (as applicable) | This sect | tion to be comp | leted only | if Examiner/ | Evalu | ator notes | RI or Unaco | eptable cor | dition. | |
| Additional Actions:
Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action:
EVEL III or RE REVIEW (as applicable) Actor How RPD T. HILL, P.L. DATE: 1 & FEB. 10 | | | | | | | | - | ł | 1 |
| Action Request, Work Order, Issue Report, etc. Initiated for Corrective Action:
EVEL III or RE REVIEW (as applicable) | • | | | | | | | | | |
| EVEL III OF RE REVIEW (as applicable) | | | etc. initiated fo | r Corrective Action | 11-7 | | | | 1 | |
| | | | 21 | n | 6 | OWERD T. P | VIEL, PE DA | TE: 16 Fee | 3 10 | · |
| | | | 7 | | | | | | | |
| | ANNI REVIEW (| is applicable) | * | | | | UA | 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

| Station: 7MI Unit: 1 | Date: /-/8- | | |
|--|-------------------------------|---|----------|
| System: w/A Component: w/A | | WO No(s) .: R2154245 | <u> </u> |
| Location: Building Communer Elev | n: C | col | I |
| Exam Type: DV GV XVT-1C V | | Exam: Direct Remote Matl. Type: Course | |
| Design Drawing(s) | Visual A | ids /// | <u>a</u> |
| Surface: ID OD | | Components Coated: YES X NO | |
| M&TE Used: Test CA | | Serial No. 6004554474 Cal. Due Date: | - |
| Illumination Used FLASHLIGHT | | ination Verified: Date: 1-13-10 Time: 8:30 | A A4 |
| Special / Specific Instructions: N/A | | | |
| Component / Item Number and | RESULTS | Explanation / Notes | |
| Description | NI RITYPE | IO (As a minimum, Record Location and Size of | |
| (e.g. EIN, EIO, etc.) | | Recordable Indications as applicable) | · |
| Dans Azer | | R BOARING PLATES ATTA CORROSION, | |
| TONDON REAKA | | REVIOUSLY RECORDED, REPAIR MADE AND | |
| | | REMAINS STREES | |
| | | | |
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| | Results | Lenend: | |
| NI - No Indication | | ble Indication IO - Information Only | |
| | Recordable Indica | | |
| · · · | Settlements Or De | | |
| | Degraded Patches | | |
| | Popouts : Voids, Hi
Spalls | Direycomb O Abrasion, Cavitation, Wear
P Air Voids / Bug Holes | |
| | Cold Joint Lines | Q. Efforescence | |
| | Corrosion Staining | R. Other (Explain) | |
| Supplemental Information : Yes PNo | Sketch | hoto Video Other (Describe): | |
| Re | suits. Acceptable | XYes No | |
| EXAMINER/EVALUATOR | a al | NOUP | |
| (Print & Sign) | SHEA TAM | ELEVEL I DATE 14370 | |
| STATION/ADMIN REVIEW | obsin C | DATE 3/1/2010 | _ |
| This section to be completed on | ly if Examiner/ | Evaluator notes RI or Unacceptable condition. | |
| RI or Unacceptable results Acceptable | | | |
| Additional Actions: | | ~ | |
| Additional Actions.
(Action Request, Work Order, Issue Report, etc. initiated | I for Corrective Acues | | |
| LEVEL III or RE REVIEW (as applicable) | alle | (Howard T. Hill, CE) DATE: 16 FEB 10 | |
| ANII REVIEW (as applicable) | | DATE: | |
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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

| | <u> </u> | je i or i | |
|--|--|--|--|
| Station: 7HZ Unit: 1 | Date | : 11-21-0 | 9 Report No: |
| System: w (Component: w (| <u>k</u> | | WO No(s): 22/54265 |
| Location: Building: Communer | Elev.: | Col.:. | 4/4 Row: 4/4 Azimuth/Radius: |
| Exam Type: DV GV VT-1C | TVT-3C Ty | pe Of Exa | m: Direct XRemote Matl. Type Coursens |
| Design Drawing(s) | | | anocucaes |
| Surface: ID OD | | | mponents Coated: YES 😡 NO |
| | est Card UT | C or Seria | I No. 0002551272 Cal. Due Date: 5-17-10 |
| Illumination Used FLASALIENT | | Illuminat | ion Verified: Date: 11-27-09 Time: 1200 |
| | 4 | | |
| Component / Item Number and | sector and the sector of the s | ULTS | Explanation / Notes |
| Description
(e.g. EIN, EID, etc.) | NI RIT | YPE 10 | (As a minimum, Record Location and Size of Recordable Indications as applicable) |
| (E.g. Lint, LID, Elc.) | | A | STRATE CRACKS A HOUSE DOVE TON ON POCHETS ALL |
| Rinser an | | | (0.010" #185 |
| | | K | DEARADED BROUT PATENES |
| | | 7 | ABANDONOOD ELECTRICAL BOXES, NEALY |
| | | 1 | CORBOSION |
| | | | |
| | | | |
| | | | |
| | | esults Leger | |
| NI - No Indica | | | lication IO - Information Only |
| A Cracks (Characterize and Size) G | | Indication 1 | |
| B. Exposed Reinforcing Steel H | | | |
| C. Exposed Metallic Items (Other) I. | Popouts , Vo | | omb O. Abrasion, Cavitation, Wear |
| D. Evidence Of Grease Leakage J. | | | P Air Voids / Bug Holes |
| E. Evidence Of Maisture K. | | | Q. Efflorescence |
| F. Leaching Or Chemical Attack L. | Corrosion Sta | aining
Photo | R. Other (Explain) |
| Supplemental Information : Yes XNo | Results. Accept | | ☐Video ☐ Other (Describe):
ØYes ☐No |
| EXAMINER/EVALUATOR | | - MA | V |
| (Print & Sign) | O'Snest fran | 4. VO | LEVEL T DATE 11-2-0 |
| STATION/ADMIN REVIEW | Johnen | harmonic h | DATE 2/1/2010 |
| | | iner/Eval | uator notes RI or Unacceptable condition. |
| RI or Unacceptable results Acceptable | e 🛃 Yes | 🗌 No | |
| Additional Actions: | | | |
| Action Request, Work Order, Issue Report, etc. init | iated for Corrective | and the second s | |
| EVEL III or RE REVIEW (as applicable) | baff | How | 10 T. HUL, C.E.) DATE: 16 Fers 10 |
| NII REVIEW (as applicable) | - | | DATE: |
| and a second second second second second second second second second second second second second second second | | | |

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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

| | i age i c | | |
|--|--|---|---------------|
| Station: TMI Unit: 1 | Date: /-/ 9 | -10 Report No: | _ |
| System: N/A Component: N/A | | WO No(s) .: R215426 5 | |
| Location: Building: | v.: (| Col.: 1/4 Row: 1/4 Azimuth/Radius: | |
| Exam Type: DV DV VVT-1C V | T-3C Type Of | Exam: Direct Remote Matl. Type: Covcern | 6 |
| Design Drawing(s) | Visual A | | M |
| Surface: ID OD | Surface | / Components Coated: YES X NO | |
| M&TE Used: Test | | Serial No. Cal. Due Date: | , |
| Illumination Used Fragmunger | lliun | nination Verified: Date: /-19-10 Time: 100) | PH |
| Special / Specific Instructions: N/A | | | |
| Component / Item Number and | RESULTS | Explanation / Notes | |
| Description
(e.g. EIN, EID, etc.) | NI RITYPE | IO (As a minimum, Record Location and Size of Recordable Indications as applicable) | |
| Rino Grader | | | |
| KING GIRDER | | R EXEPOSED REAL PREVIOUSLY ROTORDED
REMIX MADE AND REMAINS STABLE | |
| 7e | | | |
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| | | | |
| | Results | Legend: | |
| NI - No Indication | the second second second second second second second second second second second second second second second s | ble Indication IO - Information Only | |
| A Cracks (Characterize and Size) G. | | ation Type Codes:
flections M. Scaling / Dusting | |
| A Cracks (Characterize and Size) G.
B. Exposed Reinforcing Steel H. | Settlements Or De
Degraded Patches | | |
| C. Exposed Metallic Items (Other) | Popouts , Voids, H | | |
| 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 | | |
| Supplemental Information : Yes RNo | And the second design of the s | Photo Video Other (Describe): | |
| | suits. Acceptable | A Tes No | |
| EXAMINER/EVALUATOR
(Pont & Sign) | Suga Ling | LEVEL I DATE MAD | |
| STATIONIADAINI DEVIEW | | LEVEL DAIL PIPE | |
| (Print & Sign) | Johnson (| DATE 2/1/2010 | |
| | | Evaluator notes RI or Unacceptable condition. | |
| RI or Unacceptable results Acceptable | • | • | 1 |
| Additional Actions: | | · · · · · · · · · · · · · · · · · · · | |
| Additional Actions.
(Action Request, Work Order, Issue Report, etc. autiate | d for Corrective Action | n*_? | |
| LEVEL III or RE REVIEW (as applicable) | 46720 | HOW ORD T. HILL, P.E.) DATE 16 FER 10 | !
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Revision 5 Page 32 of 32

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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: 7/4.7 Unit: 1 Date: //-/9-09 Report No: |
|--|
| System: u/A Component: u/A WO No(s).: Ra15 4265 |
| Location: Building: Communer Elev.: Col.: #4 Row: #14 Azimuth/Radius: |
| Exam Type: DV GV VT-1C XVT-3C Type Of Exam: Direct X Remote Matl. Type Guesant |
| Design Drawing(s) Visual Aids: Brocures |
| Surface: ID OD Surface / Components Coated: Surface / Components Coated: Surface / Components Coated: Surface / Components Coated: Surface / Surface / Components Coated: Surface / Surfac |
| M&TE Used: members I Test Card UTC or Serial No. 0002552272 Cal. Due Date: 5-11-10 |
| Illumination Used Frances Time: 1100 pm |
| 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) |
| BUT. 6 TO BUT. 1 A SMALL STRESS CRACKS 40.010 WIDE |
| FROM ZING GIRDER TO JUTER MEDINTS D D CLO ORETHER STAILE ADDIND GREASE CAPS |
| AND ONCESTE AROUND BENKING FLATES, |
| JAACTIVE . |
| P SMALL ZUMMOLUS |
| 4 DEBRADED GABUT TATCHES AT FOUR LINES |
| H DEBRADED GABLE STATCHES AT POUR LINES
AND FOUN THE WOLET |
| |
| Resuits Legend: |
| NI - No Indications RI - Recordable Indication 10 - 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. Efforescence |
| F. Leaching Or Chemical Attack L Corrosion Staining R. Other (Explain) |
| Supplemental Information : Yes No Sketch Photo Video Other (Describe): |
| Results. Acceptable XYes No |
| (Print & Sign) DATE 11-19-29 |
| (Print & Sign) Davies 10 Second & Uniter Level T DATE 11-19-29 |
| (Print & Sign) DATE 2/1/2010 |
| 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 OF RE REVIEW (as applicable) June And Ale Howard T. Hul CE DATE: 16 FER 10 |
| ANII REVIEW (as applicable) DATE: |

Page \_\_\_\_ of \_\_\_\_

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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

| | | Page 1 | | ······································ |
|--|-------------|----------------------------|---------|---|
| Station: TMT Unit: 1 | | Date: //-/ | 9-09 | Report No: |
| System: | | | | WO No(s) .: R2154245 |
| Location: Building: Communer Ele | v .: | C | ol.:. | 4 Row: 4/4 Azimuth/Radius |
| Exam Type: DV GV VT-1C X | T-30 | C Type Of | Exa | m: Direct IRemote Matl. Type Courses |
| Design Drawing(s) | | | | BINOCULARS |
| Surface: ID OD | | | | mponents Coated: 🔲 YES 😥 NO |
| M&TE Used worklanere I Test | Card | UTC or S | Seria | I No. 0002551272 Cal. Due Date: 5-11-10 |
| Illumination Used France | | | | on Verified: Date://-/9-09 Time: 3:00 PM |
| Special / Specific Instructions: | | ••••••••••••••••• | | |
| Component / Item Number and | | RESULTS | | Explanation / Notes |
| Description | NI | RITYPE | 10 | (As a minimum, Record Location and Size of |
| (e.g. EIN, EID, etc.) | | · | | Recordable Indications as applicable) |
| Bur. In Bur. 2 | | | A | SMALL STRESS CRACKS LO.DID " WIDE |
| FRAM RUNG GIRDER TD | | | ۵ | GARASE STAINS AROUND CAPS AND |
| THRANK BLD RODF | | | | ON CONCRETE ADOND BEAMINE PLATES |
| | | | | INACTIVE. |
| | | | | |
| | | | Р | SMALL BUSINES |
| | | | H | DOGRADED GROUT PATINES AT TOURSILES AND |
| | L | | | PORM THEYERLET |
| NI - No Indication | | Results I
R: . Recordat | | id:
lication IO – Information Only |
| | | ordable Indica | | |
| A Cracks (Characterize and Size) G. | | ments Or Def | | |
| B. Exposed Reinforcing Steel H. | | aded Patches | | |
| C. Exposed Metallic Items (Other) I. | | uts, Voids, Ho | ineyc | |
| | Spalls | s
Joint Lines | | P Air Voids / Bug Hotes
Q. Efflorescence |
| F. Leaching Or Chemical Attack L | | sion Staining | | R. Other (Explain) |
| Supplemental Information : Yes ANo | | Sketch | noto | Video Other (Describe); |
| and and a second second second second second second second second second second second second second second se | sults. | Accepteble | Į | Yes No |
| EXAMINER/EVALUATOR
(Print & Sign) | • | 1 hours / h | 16 | LEVEL T DATE 14-19-09 |
| STATION/ADMIN REVIEW | ·) | | | DATE 2/1/2010 |
| (Print & Sign) Exercl | <u>orns</u> | | | |
| - | ÷ . | | | uator notes RI or Unacceptable condition. |
| RI or Unacceptable results Acceptable | Ŕ | res [No | 1 | |
| Additional Actions:
(Action Request, Work Order, Issue Report, etc. initialed | t for C | orrectures Actions | | |
| LEVEL III or RE REVIEW (as applicable) | 1.50 | Jul- | | GRORD T. HILL, CE.) DATE: 16 FEB 10 |
| ANII REVIEW (as applicable) | W. | | <u></u> | DATE: |
| TITI TAL VIE VV (as applicable) | | | | UNIE. |

Page \_\_\_\_ of \_\_\_\_

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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

| | | | rage 1 | <u>97 1</u> | | |
|---|--|---|---------------------------------|-------------|---|--|
| Station: TMJ | Unit: 1 | | Date: //- / | 19-0 | Report No: | |
| System:-/+ (| Component: ~/ | A- | | ******* | WO No(s) .: Ral 5 426 5 | |
| Location: Building: Communer Elev .: | | | (| Col.:. | ala Row: MA Azimuth/Radius | |
| Exam Type: DV | | XVT-30 | | | m: Direct XRemote Matl. Type Guerran | |
| Design Drawing(s) | tarting the second second | See. | | | BROCHARS | |
| Surface: ID | OD | | | | mponents Coated: TYES VINO | |
| M&TE Used uperMan | × 🕅 | est Card | UTC or S | Seria | al No. 0002551272 Cal. Due Date: 5-11-10 | |
| Illumination Used FL | ATALI GHT | | Illun | ninat | ion Verified: Date: 1+19-01 Time: 3:00 | |
| Special / Specific In: | | A | | | | |
| Component / Ite | | | RESULTS | 1.10 | Explanation / Notes | |
| Descri
(e.g. EIN, I | | NI | RITYPE | 10 | (As a minimum, Record Location and Size of
Recordable Indications as applicable) | |
| | 2101 010.7 | | f | | | |
| Bur L to Ber 3 | | ĺ | | A | SMALL STRESS CRACKS <0.010" whe | |
| FROM RING GURDER | | | | P | Small BUGADLES | |
| | | | } | | | |
| | | | | V | GEASE STAINS AROUND CAPS ANDON | |
| | | | | | CONCRETE AROUND SEANNE PLATES,
ALL INACTIVE | |
| | | | | <u> </u> | DEGRADO GRANT PATIMED AT FOORLANCE AND | |
| | | | | H | BRA DE MUS | |
| | | | Results | | | |
| | Ni - No Indic | | RI - Recordat
ordable Indica | | dication IO - Information Only | |
| A. Cracks (Characteria | te and Size) | | ments Or Def | | | |
| | | | ded Patches | | pairs N. Coating Deterioration | |
| C Exposed Metallic Items (Other) I F | | | uts, Voids, Ho | neyc | | |
| D. Evidence Of Grease | | | | | P Air Voids / Bug Holes | |
| | | | loint Lines | | Q. Efforescence | |
| F. Leaching Or Chemical Attack L. Corrosion Staining R. Other (Explain)
Supplemental Information : Yes No Sketch Photo Video Other (Describe): | | | | | | |
| | | and the second second second second second second second second second second second second second second secon | Acceptable | | Yes No | |
| EXAMINER/EVALUA | TOR Januar R | | 12-114 | Z | 0 | |
| (Print & Sign)
STATION/ADMIN RE | | - | 1 | | | |
| (Print & Sign) | tues | <u>مەر</u> | - Lais | | DATE 2/1/2010 | |
| | • | - | | | uator notes RI or Unacceptable condition. | |
| RI or Unacceptable re | esults Acceptabl | le 🔍 Y | ′es 🗌 No | 2 | | |
| Additional Actions: | | | | | | |
| Action Request, Work Order, | Issue Report, etc. init | tiated for Co | orreative Action | | | |
| EVEL III or RE REVI | EW (as applicable) | Having | De | <u>_</u> | AVARE THIC PS DATE: 16 FOR 10 | |
| NII REVIEW (as applic | able) | | | | DATE: | |
| | والمتقاربي ومكافرة بالمتنافي ومحمد متكمني مسجع | | | | | |

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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: 7MJ | - Unit:≰ | | Date: //- | 10-0 | 9 Report No: | |
| System: A Component: A | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | WO No(s) .: 22154265 | |
| Location: Building: Communer Elev .: | | | (| Col.: | A Row: MA Azimuth/Radius: | |
| | | IVT-30 | | | m: Direct XRemote Matl. Type: Gucrene | |
| Design Draw | | | Visual A | | Runcerars | |
| Surface: | ID OD | | Surface | /Co | mponents Coated: YES 🔀 NO | |
| M&TE Used: | userHerez 7 Tes | st Card | UTC or | Seria | No.0002551272 Cal. Due Date: 5-11-10 | |
| | Ised FLASHUGHT | | Illun | ninati | on Verified: Date: //- 20-09 Time: /2:00 | |
| | cific Instructions: NA | | | | | |
| Componi | ent / Item Number and | | RESULTS | | Explanation / Notes | |
| 10.1 | Description | NI | RITYPE | 01 | (As a minimum, Record Location and Size of
Recordable Indications as applicable) | |
| | I. EIN, EID, etc.) | | | A | SALL STRESS CRACKS 40.010 | |
| Bur 3 n Bl | | | | P | SAME BUDNOLOS | |
| FRAN RUNE GI | RATZ TO | | | 5 | GREASE STANSAROUND CAPS AND ON CONCRETE | |
| FHE BOOF | | | | - | A BOME BURRING PUTTES, ALL INACTIONS | |
| | | | Н | | GROWT PATCH WITH WHALROUS CLACKS | |
| | NI - No Indicati | ons | Results
RI - Recordal | | d:
ication 10 - Information Only | |
| | | | ordable Indica | | | |
| A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting | | | | | | |
| B Eynneed D | | | | | | |
| | etallic items (Other) | | | | | |
| C. Exposed M
D. Evidence O | of Grease Leakage J. | Popou
Spalls | ris, Voids, Ho | | omb O. Abrasion, Cavitation, Wear
P. Air Voids / Bug Holes | |
| C Exposed M
D Evidence O
E Evidence O | Of Grease Leakage J.
Of Moisture K. | Popou
Spalls
Cold J | ris , Voids, Ho
Ioint Lines | | O. Abrasion, Cavitation, Wear
P. Air Voids / Bug Holes
Q. Efflorescence | |
| C. Exposed M
D. Evidence O
E. Evidence O
F. Leaching O | of Grease Leakage J. | Popou
Spalls
Cold J
Corros | ris, Voids, Ho | oneyc | Domb O. Abrasion, Cavitation, Wear
P. Air Voids / Bug Holes
Q. Efflorescence
R. Other (Explain) | |
| C. Exposed M
D. Evidence O
E. Evidence O
F. Leaching O | of Grease Leakage J.
of Moisture K.
Ar Chemical Attack L.
nformation : ⊡Yes ⊡No | Popou
Spalls
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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

| | | Pager | <u> </u> | | | | | | | |
|--|-------------|---------------|----------------------------|--|--|--|--|--|--|--|
| Station: 747 Unit: 1 | Date: // | 10-0 | A Report No: | | | | | | | |
| System: _/ Component: _/ | | | WO No(s).: R2154265 | | | | | | | |
| Location: Building: Commercor- | (| Col.:. | Ha Row: MA Azimuth/Radius: | | | | | | | |
| Exam Type: DV GV VT-1C | ZVT-3C | Type Of | Exa | m: Direct Remote Matl. Type Current | | | | | | |
| Design Drawing(s) | | | | BINOCULARS | | | | | | |
| Surface: ID OD Surface / Components Coated: 🗌 YES 😥 NO | | | | | | | | | | |
| M&TE Used unterner A Test Card UTC or Serial No. 0003553272 Cal. Due Date: 5-17-10 | | | | | | | | | | |
| Illumination Used Finsencer Time: 12100 PM | | | | | | | | | | |
| Special / Specific Instructions: | | | | | | | | | | |
| Component / Item Number and | | RESULTS | | Explanation / Notes | | | | | | |
| Description
(e.g. EIN, EID, etc.) | NI | RITYPE | 10 | (As a minimum, Record Location and Size of Recordable Indications as applicable) | | | | | | |
| Borr 1 no Burr -5 | | | 1 | SANU STRESS CRACKS 40.010" WIDE | | | | | | |
| DUTT THE DUTT-S
FROM RUG MRDUR
TO 305 ELV. | | [| P | SMALL BUOMOLES | | | | | | |
| | | | 3 | GREASE STAINS AROUND CAPS AND ON CONCRET
MOUND REASTING PLATES, ALL MALETING | | | | | | |
| | 8 | н | | GROUT PATCH WITH WUMEROUS CRACKS >0.010
WIDE, PREVIOUSLY RECORDED | | | | | | |
| Results Legend: | | | | | | | | | | |
| Ni - No Indications RI - Recordable Indication 10 - Information Only | | | | | | | | | | |
| A. Cracks (Characterize and Size) G. Settlements Or Deflections M. Scaling / Dusting | | | | | | | | | | |
| B. Exposed Reinforcing Steel H. Degraded Patches or Repairs N. Coating Deterioration | | | | | | | | | | |
| Exposed Metallic Items (Other) I. Popouls, Voids, Honeycomb O. Abrasion, Cavitation, Wear | | | | | | | | | | |
| Evidence Of Grease Leakage J. Spalls P Air Voids / Bug Holec
Evidence Of Moisture K. Cold Joint Lines Q. Efforescence | | | | | | | | | | |
| Leaching Or Chemical Attack L. Corrosion Staining | | | | R. Other (Explain) | | | | | | |
| Supplemental Information : TYes INo | <u>, Ds</u> | Sketch 🔲 P | hoto | Video Other (Describe): | | | | | | |
| Results. Acceptable Yes No | | | | | | | | | | |
| EXAMINER/EVALUATOR | OSara K | Del! | 04 | LEVEL T DATE 11-10-09 | | | | | | |
| (Print & Sign) Dames C | | <u>с</u> | | | | | | | | |
| Print & Sign) Evan | John | <u>son (/</u> | | DATE 2/1/2010 | | | | | | |
| This section to be completed only if Examiner/Evaluator notes RI or Unacceptable condition. | | | | | | | | | | |
| Action Request. Work Order, Issue Report, etc. initiated for Corrective Action | | | | | | | | | | |
| EVEL III OR RE REVIEW (as applicable) ABUTAN PART (HOW ORD T. Hill, C.E.) DATE: 16 FEB 10 | | | | | | | | | | |
| NII REVIEW (as applicable) DATE: | | | | | | | | | | |
| | | | | | | | | | | |

Page \_\_\_\_ of \_\_\_\_

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