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CONTAINMENT BUILDING TENDON SURVEILLANCE

FIVE-YEAR SURVEILLANCE

PALISADES NUCLEAR PLANT

CONSUMERS POWER COMPANY

by

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SCIENTIFIC DEVELOPMENT
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1.0 INTRODUCTION

The Containment Building Tendon Surveillance Program is a systematic means of assessing the continuing quality and structural performance of the containment post-tensioning system. The surveillance consists of periodic inspection for physical condition of a randomly pre-selected group of surveillance tendons. This provides confidence in the condition and functional capability of the system and an opportunity for timely corrective measures if adverse conditions are detected.

This report covers the fifth-year tendon surveillance for Palisades Nuclear Plant as specified by Paragraph 4.5.4 of Amendment No. 14 (April 24, 1975) to Provisional Operating License No. DPR-20. The fifth-year tendon surveillance is the third in the series with previous tests at one-year and three-years after the containment structural integrity test.

Bechtel services were provided under the CPCO/Bechtel Technical Services Agreement, CPCO Purchase Order No. 45237, Bechtel Job No. 10512-018. Equipment, manual labor, and materials required for the tendon surveillance were furnished by Inryco, Inc. under contract with Consumers Power Co.

2.0 SUMMARY AND CONCLUSIONS

2.1 Summary

The fifth-year tendon surveillance of the Palisades Nuclear Plant containment post-tensioning system was conducted from September to December, 1975. The surveillance was done in accordance with "Surveillance Testing of Containment Building Post-Tensioning System," Procedure Number TSF-2, Rev. 0. The group of surveillance tendons selected for inspection was composed of five vertical, six dome, and ten hoop tendons. The tendon inspection consisted of anchorage and sheathing filler inspection, tendon liftoff force measurement, tendon wire inspection and tensile testing, and tendon retensioning and resealing.

The anchorage and sheathing filler inspection showed the following:

- o The anchorage components showed no significant corrosion which would indicate degradation of the post-tensioning system.
- o The off-size buttonheads which were detected (total of 53 out of 3780 buttonheads inspected) showed no evidence of adversely affecting the load carrying ability of the tendons.
- o A number of split buttonheads (total of 63 out of 3780 buttonheads inspected) were found, but all of them were probably present when the post-tensioning system was installed and showed no evidence of adversely affecting the system.
- o No cracking of anchor heads, bushings, or bearing plates was found. One shim was found with a small crack which was probably present during the tendon installation.

Every tendon tested had measured liftoff force within the prescribed acceptance limits of 584 to 815 kips for dome tendons and 615 to 815 kips for vertical and hoop tendons.

Wire corrosion was found to be insignificant and no more severe than that observed during previous surveillance tests.

A total of five discontinuous wires were found in the 21 surveillance tendons having a total of 1885 wires. Four of the five discontinuous wires occurred during installation. The fifth had a break which resulted from a material defect.

Each of the tensile test specimens from the inspection wires had ultimate strength greater than the 11.78 kips per wire minimum acceptance criterion. For the discontinuous wires 10 out of 15 samples exceeded the 11.78 kips per wire criterion, 4 were below by 0.4% which is within the uncertainty of the measurement, and one sample was 5% below the 11.78 kips per wire and was caused by a wire defect in manufacture.

Each surveillance tendon was retensioned to within $\pm 3\%$ of the liftoff force measured during detensioning. The grease cap was reinstalled on each tendon, and new sheathing filler was pumped or poured into the tendon sheath to replace that which was removed during the surveillance test.

2.2 Conclusions

Based on the results of the fifth-year tendon surveillance test reported herein, the conclusion is reached that no abnormal degradation of the containment structure post-tensioning system is indicated for Palisades Nuclear Plant.

A five-year tendon surveillance cycle as specified in Amendment No. 14 (April 24, 1975) to Provisional Operating License No. DPR-20 is recommended.

3.0 GENERAL

The five-year tendon surveillance of Palisades Nuclear Plant containment post-tensioning system began in September, 1975, approximately 66 months after completion of the containment structural integrity test performed in March, 1970.

Tendon surveillance testing consists of anchorage and sheathing filler inspection, tendon liftoff force measurement, tendon wire continuity testing, tendon wire inspection and tensile testing, and tendon retensioning and resealing.

This surveillance was conducted in accordance with Consumers Power Company TSF-2, Rev. 0-Technical Specifications Test Procedure, Surveillance Testing of Containment Building Post-Tensioning System. A copy of that test procedure is included in this report as Appendix A.

The group of surveillance tendons selected for inspection was composed of five vertical, six dome (two from each of the three dome groups), and ten hoop tendons in compliance with NRC Regulatory Guide 1.35 (Rev. 1, June 1974). The location and identification of the surveillance tendons are shown in Figures 3.1 and 3.2.

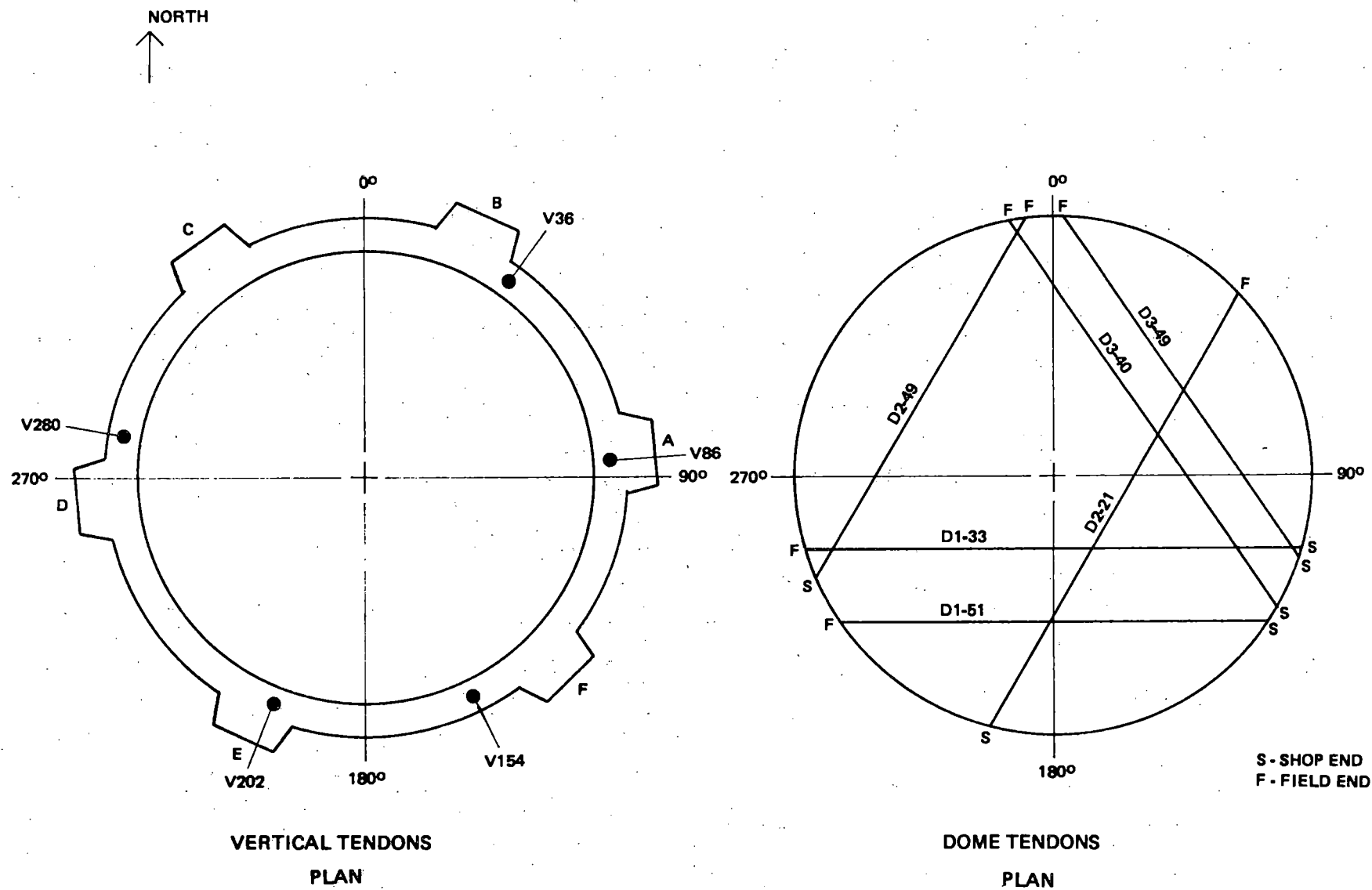


FIGURE 3.1 – LOCATION AND IDENTIFICATION OF VERTICAL AND DOME SURVEILLANCE TENDONS

FIGURE 3.2 – LOCATION AND IDENTIFICATION OF HOOP SURVEILLANCE TENDONS

4.0 TENDON FILLER AND END ANCHORAGE ASSEMBLY

4.1 Sheathing Filler

A sample of sheathing filler was removed from each end of each surveillance tendon. Chemical tests were performed on one sample from each tendon. For the vertical tendons the sample from the field end (i.e., the bottom end) was analyzed in each case because any water contamination is likely to be more severe on that end. For the dome and hoop tendons the sample analyzed was selected arbitrarily from the shop or field end with an effort made to use approximately the same number of samples from each of the two ends.

Current practice for acceptance of sheathing filler for new installation is to limit each of the three water soluble materials - chlorides, nitrates, and sulfides - to less than 5 parts per million each. All the tested samples from the surveillance tendons met those requirements. The maximum concentrations of chlorides, nitrates, and sulfides were 1.4, 0.7 and 0.5 ppm respectively. Complete results of the sheathing filler analyses are given in Table 4.2.

The means of the sheathing filler analyses for the one-year, three-year, and five-year tendon surveillance tests are presented in Table 4.3. The reserve alkalinity as indicated by the neutralization number was approximately the same for the five-year test as for the three-year test. Water content and concentration of water solubles were equal to or less than that found during the one-year and three-year tests. Thus, no detectable deterioration with time of the sheathing filler was found.

4.2 Buttonheads

Buttonhead inspection revealed two cases of discoloration due to corrosion, one tendon with a relatively large number of offsize buttonheads, and two tendons with several split buttonheads. All buttonheads had complete coverage by the tendon sheathing filler.

Buttonheads with spots having corrosion level 2 (visible oxidation, no pitting) were detected on the field end of vertical tendons V36 and V86. That degree of buttonhead corrosion is slight and does not degrade the load carrying ability of the buttonheads; furthermore, since it is covered with tendon sheathing filler, it will not spread or pit sufficiently to cause any functional problem. The buttonhead corrosion is considered to be insignificant.

Vertical tendon V280 had 25 undersize buttonheads on the field end. The liftoff force for that tendon was 671 kips which is well above the minimum acceptance level of 615 kips. (See Section 5.1 for discussion of liftoff forces.) In this particular case no sign of adverse effects from the undersize buttonheads was found. Therefore, the presence of these undersize buttonheads is considered to cause no functional problem for tendon V280.

Two tendons were found to have several split buttonheads. Hoop tendon 59BD had 11 split buttonheads on the shop end. No buttonhead had more than one split, and the maximum split width was estimated to be between 0.010 and 0.015 in. Dome tendon D2-21 had 9 split buttonheads on the shop end. No buttonhead had more than one split, and the maximum split width was estimated to be approximately 0.030 in. For the original installation the applicable standard governing split buttonheads was Inryco, Inc. "Button Head Criteria 1610" included in this report as Appendix H. In those criteria the buttonhead maximum split

width is limited to 0.060 in. All the split buttonheads discussed above met that criterion. Therefore, the conclusion is reached that the split buttonheads were probably present during tendon installation and do not indicate abnormal degradation of the containment post tensioning system and will cause no functional problems.

4.3 Anchorheads and Bushings

The anchorhead and bushing corrosion level was generally judged to be corrosion level 1 (bright metal). In three cases (V36, V86, and V154) one or both ends had corrosion level 2 (visible oxidation, no pitting). One tendon anchor head (V154 field end) had an area with corrosion level 3 (pitting to 0.003 in.).

In none of the cases is corrosion considered to be a significant problem.

All anchorheads and bushings were completely covered by tendon sheathing filler.

No split or cracked anchorheads or bushings were encountered.

4.4 Shims

All shims were judged to have no areas of active corrosion. Shim corrosion was limited to discoloration and mill scale.

All shims were completely covered by tendon sheathing filler.

One 3 in. shim on the shop end of tendon 59 BD had a shallow (approximately 1/16 inch deep) crack across one surface. The crack probably resulted from the process of hot rolling the stock material from which the shim was cut and not from any stress effects in service. The cracked shim and its mate were replaced with a new pair when the tendon was retensioned.

4.5 Bearing Plates

The bearing plate areas covered by a grease cap showed no sign of active corrosion.

The surface condition was the original mill scale with no sign of recent corrosion.

All areas under a grease cap were well covered by tendon sheathing filler.

Bearing plate areas not covered by a grease cap showed no active corrosion except in the tendon gallery. In the tendon gallery, where the air is very humid, many of the bearing plates had active corrosion which consisted of light scale.

In view of the thickness of the bearing plates, the corrosion was not detrimental.

No cracks or splits of the bearing plates were found.

4.6 Surrounding Concrete

Inspection of the concrete surrounding the bearing plates for the surveillance tendons revealed one area of cracking. The area between dome tendons D3-40 (field end) and D3-38 had a crack 6 ft. long with width variable between 0.003 and 0.007 in. The plot of that concrete crack is included in Appendix C.

Although no concrete cracking was found in the tendon gallery near the surveillance tendons, the area from V324 to V16 was found to have a series of fine cracks sufficient to allow enough sheathing filler leakage to wet the overhead area in the vicinity of those tendons. Those cracks were not considered as a serious problem, but they were plotted to allow monitoring during future five-year tendon surveillance tests.

Those plots are included as Appendix J.

Tendon			Complete Filler Coating					Buttonheads				Anchor Head		Anchor Head Bushing		Shims		Bearing Plate		Date Inspected
Tendon No.	Shop or Field End		Cap	Buttonheads	Anchor Head and Bushing	Shims	Bearing Plate	Total No.	Corrosion Level	No. of Splits	No. Offsize	Corrosion Level	Cracks	Corrosion Level	Cracks	Corrosion Level	Cracks	Corrosion Level	Cracks	
Vertical	V36	S	Y	Y	Y	Y	Y	90	1	1	0	2	N	2	N	2	N	2	N	9/29/75
		F	Y	Y	Y	Y	Y	90	2	0	0	2	N	NA	NA	1	N	3	N	9/26/75
	V86	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	2	N	10/1/75
		F	Y	Y	Y	Y	Y	90	2	0	8	2	N	NA	NA	3	N	4	N	10/1/75
	V154	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	2	N	1	N	2	N	10/2/75
		F	Y	Y	Y	Y	Y	90	1	0	0	3	N	NA	NA	2	N	2	N	10/2/75
	V202	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	2	N	10/3/75
		F	Y	Y	Y	Y	Y	90	1	0	0	1	N	NA	NA	1	N	1	N	10/3/75
	V280	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	2	N	10/7/75
		F	Y	Y	Y	Y	Y	90	1	0	25	1	N	NA	NA	1	N	1	N	10/7/75
Dome	D1-33	S	Y	Y	Y	Y	Y	89	1	0	0	1	N	1	N	1	N	1	N	10/23/75
		F	Y	Y	Y	Y	Y	89	1	4	0	1	N	NA	NA	1	N	1	N	10/23/75
	D1-51	S	Y	Y	Y	Y	Y	90	1	1	0	1	N	1	N	1	N	1	N	10/28/75
		F	Y	Y	Y	Y	Y	90	1	0	0	1	N	NA	NA	1	N	1	N	10/28/75
	D2-21	S	Y	Y	Y	Y	Y	90	1	9	0	1	N	1	N	1	N	1	N	10/22/75
		F	Y	Y	Y	Y	Y	90	1	2	0	1	N	NA	NA	1	N	1	N	10/22/75
	D2-49	S	Y	Y	Y	Y	Y	90	1	1	0	1	N	1	N	1	N	1	N	10/20/75
		F	Y	Y	Y	Y	Y	90	1	0	0	1	N	NA	NA	1	N	1	N	10/20/75
	D3-40	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	1	N	10/16/75
		F	Y	Y	Y	Y	Y	90	1	0	0	1	N	NA	NA	1	N	2	N	10/16/75
Hoop	D3-49	S	Y	Y	Y	Y	Y	90	1	4	0	1	N	1	N	2	N	1	N	10/14/75
		F	Y	Y	Y	Y	Y	90	1	1	2	1	N	NA	NA	1	N	2	N	10/14/75
	49AE	S	Y	Y	Y	Y	Y	90	1	2	0	1	N	1	N	1	N	1	N	12/2/75
		F	Y	Y	Y	Y	Y	90	1	0	0	1	N	NA	NA	1	N	2	N	12/2/75
	59BD	S	Y	Y	Y	Y	Y	87	1	11	0	1	N	1	N	1	Y	1	N	11/17/75
		F	Y	Y	Y	Y	Y	87	1	2	0	1	N	NA	NA	1	N	2	N	11/17/75
	63BD	S	Y	Y	Y	Y	Y	90	1	6	0	1	N	1	N	1	N	1	N	11/18/75
		F	Y	Y	Y	Y	Y	90	1	0	0	1	N	NA	NA	1	N	2	N	11/18/75
	80BD	S	Y	Y	Y	Y	Y	90	1	4	0	1	N	1	N	1	N	1	N	11/19/75
		F	Y	Y	Y	Y	Y	90	1	1	0	1	N	NA	NA	1	N	1	N	11/19/75
	66BF	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	1	N	11/24/75
		F	Y	Y	Y	Y	Y	90	1	4	0	1	N	NA	NA	1	N	2	N	11/24/75
	71BF	S	Y	Y	Y	Y	Y	90	1	3	0	1	N	1	N	1	N	2	N	11/25/75
		F	Y	Y	Y	Y	Y	90	1	1	0	1	N	NA	NA	1	N	2	N	11/25/75
	79BF	S	Y	Y	Y	Y	Y	89	1	3	0	1	N	1	N	1	N	1	N	11/26/75
		F	Y	Y	Y	Y	Y	89	1	2	7	1	N	NA	NA	1	N	2	N	11/26/75
	56DF	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	1	N	10/30/75
		F	Y	Y	Y	Y	Y	90	1	0	1	1	N	NA	NA	1	N	1	N	10/30/75
	68DF	S	Y	Y	Y	Y	Y	90	1	1	3	1	N	1	N	1	N	1	N	11/4/75
		F	Y	Y	Y	Y	Y	90	1	0	4	1	N	NA	NA	1	N	1	N	11/4/75
	76DF	S	Y	Y	Y	Y	Y	90	1	0	0	1	N	1	N	1	N	1	N	11/5/75
		F	Y	Y	Y	Y	Y	90	1	0	3	1	N	NA	NA	1	N	1	N	11/5/75

Y — Yes
N — No
NA— Does not apply

S — Shop End
F — Field End

CORROSION LEVELS
1. Bright metal, no visible oxidation.
2. Reddish brown color — no pitting.
3. $0 < \text{Pitting} \leq .003''$
4. $.003'' < \text{Pitting} \leq .006''$
5. $.006'' < \text{Pitting} \leq .010''$

TABLE 4.1 — SHEATHING FILLER COVERAGE AND ANCHORAGE ASSEMBLY DATA

Tendon No.	Shop or Field End	Neutralization No. (mgKOH/gr)	Water Solubles			Water Content (%)
			Chlorides (ppm)	Nitrates (ppm)	Sulfides (ppm)	
V36	F	0.03	1.0	0.2	0.3	0.8
V86	F	0.06	0.7	0.2	0.2	0.9
V154	F	0.04	1.4	0.1	0.3	0.7
V202	F	0.02	0.6	0.1	0.4	6.5*
V202	F	0.05	0.7	0.1	0.4	4.9
V280	F	0.03	0.8	0.1	0.5	0.9
D1-33	S	0.04	0.4	0.3	0.1	0.2
D1-51	F	0.02	0.4	0.4	0.1	0.4
D2-21	F	0.02	0.4	0.4	0.2	0.3
D2-49	S	0.01	0.1	0.4	0.1	0.5
D3-40	F	0.03	0.4	0.3	0.1	0.4
D3-49	S	0.03	0.3	0.1	0.2	0.2
49AE	F	0.01	0.3	0.3	0.2	0.2
59BD	F	0.04	0.9	0.3	0.2	0.2
63BD	S	0.04	0.5	0.4	0.2	0.4
80BD	F	0.05	0.4	0.5	0.3	0.2
66BF	S	0.06	0.5	0.4	0.4	0.4
71BF	F	0.03	0.6	0.4	0.2	0.5
79BF	F	0.04	1.4	0.3	0.2	0.2
56DF	S	0.04	0.8	0.4	0.3	0.2
68DF	F	0.03	0.5	0.3	0.1	0.1
76DF	S	0.05	0.4	0.7	0.2	0.3

*Second sample was taken from field end of V202 because free water was mixed with sample in process of sampling.

Chemical analysis was done by Walter H. Flood & Co., Inc., Hillside, Ill.

TABLE 4.2 — LABORATORY ANALYSIS OF SHEATHING FILLER

Year of Test	Neutralization No. (mgKOH/gr)	Water Solubles			Water Content (%)
		Chlorides (ppm)	Nitrates (ppm)	Sulfides (ppm)	
1971	Not Available	1.83	0.36	0.38	Not Available
1973	.040	1.12	0.11	0.79	1.33
1975	.035	0.61	0.30	0.24	0.88

TABLE 4.3 — MEAN LABORATORY ANALYSIS OF SHEATHING FILLER

5.0 DETENSIONING AND WIRE REMOVAL

5.1 Liftoff Forces

The tendon liftoff forces were all within the range of the acceptance limits of 584 to 815 kips per tendon for dome tendons and 615 to 815 kips per tendon for vertical and hoop tendons (See Appendix A, Section 8.1). The results are summarized in Table 5.1 and are shown in more detail in Figure 5.1. The field data sheets are included as Appendix D.

Table 5.1 - Summary of Liftoff Data

Type of Tendon	Vertical	Hoop	Dome
Number of Tendons Tested	5	10	6
Minimum Liftoff Force (Kips per tendon)	651	638	640
Maximum Liftoff Force (Kips per tendon)	684	686	674
Mean Liftoff Force (Kips per tendon)	674	663	659

Prior to the surveillance tests the hydraulic jacks used for liftoff determination were calibrated according to test procedure TSF-2 (Appendix A). Based on the scatter in the calibration data (included as Appendix E) the force measurement uncertainty (for 20 to 1 odds) is estimated to be 2.0% for jack No. 9178 and 1.5% for Jack No. 9185.

5.2 Wire Inspection

To inspect for wire corrosion one wire each was removed from a vertical (V86), a dome (D3-49), and a hoop (56DF) tendon.

The inspection wire from tendon V86 had one 3 inch section with corrosion level 2 (visible oxidation, no pitting).

The wire from tendon D3-49 had one 6 inch section with corrosion level 2 and one 6 inch section with corrosion level 3 (pitting to .003 inch depth).

Those two corroded sections were included in a tensile test specimen and were found to cause no reduction in wire strength. The tensile test on that specimen showed the ultimate strength to be 12.54 kips per wire (255 ksi) [i.e., well above the minimum acceptance limit of 11.78 kips per wire]; furthermore, the break did not occur at one of the corroded sections.

No corrosion was found on the inspection wire from tendon 56DF.

Tendon wire corrosion equal to or greater than that observed during this five-year surveillance was recorded for the one-year and three-year surveillance tests. Thus, the tendon wire corrosion is apparently not becoming more severe with time.

To summarize, the wire corrosion was slight and had no significant adverse effect on wire strength.

5.3 Discontinuous Wires

A total of five discontinuous wires were found in the 21 surveillance tendons. Dome tendon D1-33 had one, and hoop tendons 79BF and 59BD had one and three discontinuous wires respectively.

The reasons for four of the five discontinuous wires were readily apparent from visual inspection. The field end buttonhead was never formed on the wire from tendon D1-33. The field end buttonhead for the wire from tendon 79BF was improperly formed and pulled part way through the anchorhead during original tendon stressing.

Visual inspection also indicated that two of the three wires from tendon 59BD were

damaged by the buttonheader grip on the field end, and the field end buttonheads broke off. One of those two damaged wires was recorded on the original stressing record.

One of the three discontinuous wires from tendon 59BD required extensive examination to determine the cause of the wire break (See Appendix I). The break occurred 3 ft. 8 in. from one end of the tendon wire. Inspection of the break and tensile tests of the wire revealed a defective length of wire approximately 10 to 15 ft. long. The defective length is judged to have been present from the time of wire manufacture. It is definitely not the result of environmental deterioration such as oxidation or stress corrosion.

In short, examination of the discontinuous wires found during the surveillance tests revealed no evidence of abnormal degradation of the post-tensioning system. One wire, out of a total 1885 wires involved in the tendon surveillance, had a break which occurred either during original tensioning or in service. That break was attributed to a material defect.

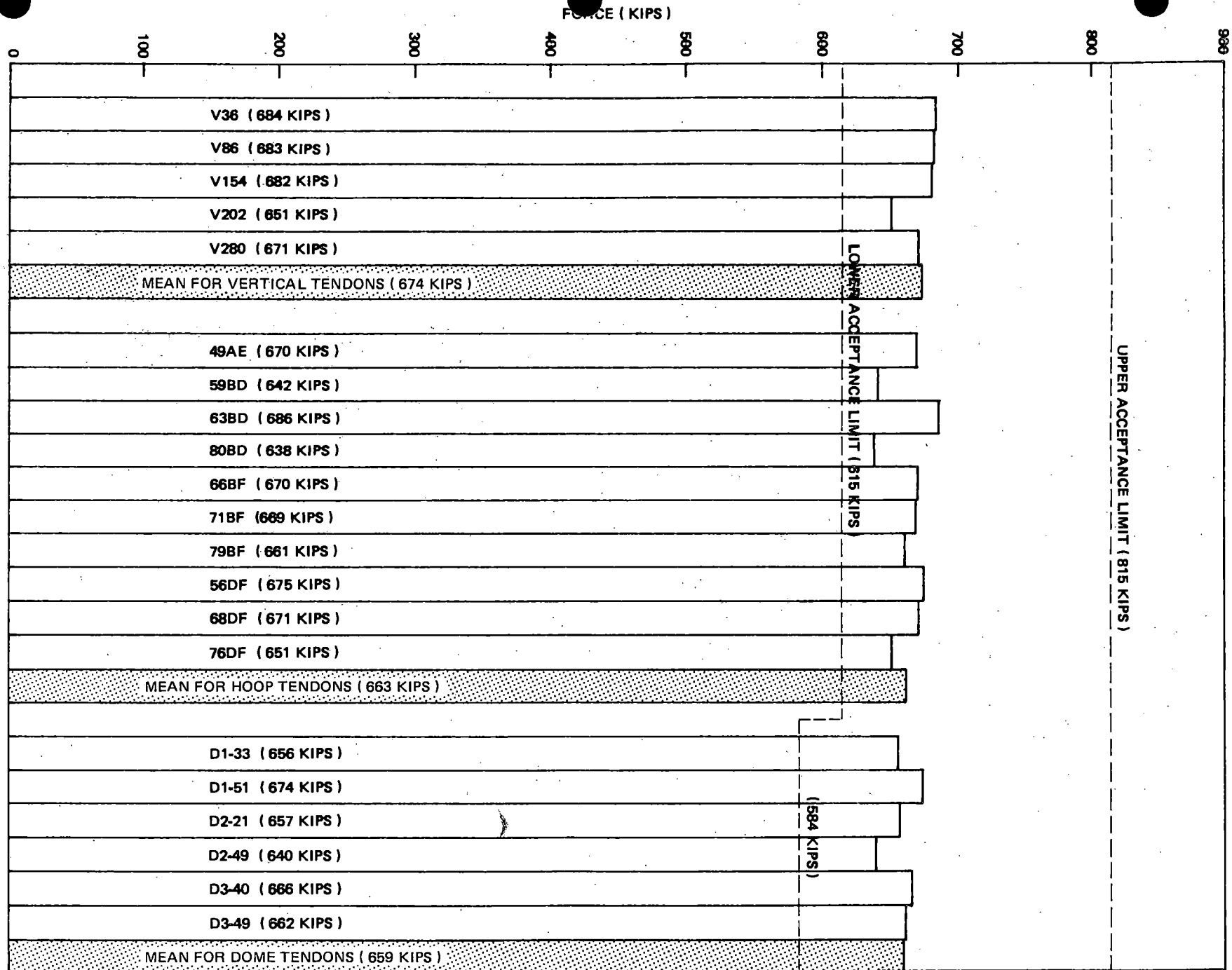


FIGURE 5.1 - TENDON LIFTOFF FORCES

6.0 WIRE TESTING

The test for wire tensile properties followed the test specified in ASTM Standard A421-74 except for gage length which was 100 in. instead of 10 in. Details of the wire tensile test procedure are given in test procedure TSF-2 (Appendix A).

6.1 Test Results

The results of the wire tensile tests using 100 in. gage length are given in Table 6.1.

6.1.1 Yield Strength

The yield strength of every tendon wire specimen exceeded the minimum yield strength at 1.0% extension of 192 ksi specified by ASTM Standard A421-74. The range was 204 to 211 ksi with a mean of 208 ksi for the nine specimens from the inspection wires. For the discontinuous wires the range for 15 specimens was 197 to 215 ksi.

6.1.2 Ultimate Elongation

The ultimate elongation of every tendon wire specimen exceeded the minimum of 4.0% specified by ASTM Standard A421-74. For the nine specimens from the inspection wires the range was 5.3 to 6.1% with a mean of 5.7%. For the discontinuous wires the range for 15 specimens was 4.5 to 6.5%.

6.1.3 Ultimate Strength

The ultimate strength for each of the nine inspection wire specimens exceeded the minimum acceptance limit of 11.78 kips per wire specified in Section 8.2 of test procedure TSF-2 (See Appendix A). Ultimate strength of 11.78 kips per wire is equivalent to the minimum ultimate strength of 240 ksi specified in ASTM Standard A421-74. The range for the nine specimens was 11.96 kips per wire (244 ksi) to 12.63 kips per wire (257 ksi) with a mean of 12.30 kips per wire (250 ksi).

For the 15 specimens from the discontinuous wires, 10 exceeded the 11.78 kips per wire criterion, 4 were below by 0.4% which is judged to be within the uncertainty of measurement, and one specimen showed ultimate strength 5% lower than the 11.78 kips per wire acceptance limit. The wire sample with 11.19 kips per wire (5% lower than the acceptance limit) was located near the break in a wire from hoop tendon 59BD which was found to have a defective length of approximately 10 to 15 ft. from the time of wire manufacture. More complete discussion of the findings is given in Section 5.3 and in Appendix I.

All test wire breaks had typical cup-cone ductile tensile fractures.

6.2 Test Equipment Calibration

Before the wire tensile tests, the hydraulic jack used to apply the tensile force was calibrated using a materials test machine. The calibration constant (i.e., effective ram area) was found to be 1.791 pounds force per psi for conditions of the wire tests. The measurement uncertainty was estimated as 0.9% of value for 20 to 1 odds.

Tendon No.		Sample No.	1% Yield Stress (ksi)	Ultimate Strength (kips/wire)	Ultimate Stress (ksi)	Percent Elongation	Location of Failure*
Inspection Wires	V86	1	207	11.96	244	5.3	M
		2	208	12.18	248	6.1	M
		3	208	12.36	252	5.0	M
	D3-49	1	208	12.54	255	5.8	M
		2	211	12.63	257	5.6	M
		3	210	12.54	255	6.0	M
	56DF	1	208	12.18	248	5.9	M
		2	204	12.14	247	5.7	M
		3	206	12.14	247	5.8	M
	Mean of Tests on Inspection Wires		208	12.30	250	5.7	
Discontinuous Wires	D1-33	1	204	11.91	243	5.7	M
		2	210	11.96	244	6.1	M
		3	217	11.91	243	6.0	M
	59BD Wire No. 1	1	201	11.73	239	6.1	M
		2	197	11.73	239	6.2	M
		3	210	11.73	239	6.5	M
	59BD Wire No. 2	1	202	11.91	243	6.0	M
		2	202	11.91	243	6.3	M
		3	213	11.82	241	6.1	M
	59BD Wire No. 3	1	215	12.54	255	4.5	M
		2	212	12.63	257	6.1	M
		3	200	11.19	228	5.0	M
	79BF	1	201	12.00	244	5.8	M
		2	206	12.04	245	5.5	M
		3	212	11.73	239	5.6	M

*BH — Within 1 inch from buttonhead.
M — Greater than 1 inch from buttonhead.

TABLE 6.1 — WIRE TEST RESULTS

7.0 RETENSIONING AND FILLER INSTALLATION

Each of the surveillance tendons was retensioned to the same stress level (+ 3%) as determined during liftoff force measurement reported in Section 5.1. A summary of the force and elongation data is given in Table 7.1, and the field data records are included as Appendix D.

After each tendon was retensioned, the grease cap was reinstalled, and new sheathing filler was pumped or poured into the tendon sheath to replace that which was removed during the surveillance test. The data sheets for sheathing filler removal and installation are included as Appendix B.

Tendon No.		Shop or Field End	1000lb./Wire			0.8 x Ultimate Strength			Liftoff After Retensioning				No. of Effective Wires During Retensioning	Date of Retensioning
			Force (Kips)	Elongation (In.)*	Total Elongation (In.)**	Force (Kips)	Elongation (In.)*	Total Elongation (In.)**	Force (Kips)	Elongation (In.)*	Total Elongation (In.)**	Increase of Total Elongation (In.)***		
Vertical	V36	S	90	2.90	2.90	851	15.80	15.80	679	14.50	14.50	0.90	90	9/30/75
	V86	S	89	3.05	3.05	841	16.50	16.50	669	14.50	14.50	0.90	89	10/1/75
	V154	S	91	2.30	2.30	851	14.80	14.80	691	14.20	14.20	1.60	90	10/2/75
	V202	S	92	1.70	1.70	851	14.50	14.50	662	13.15	13.15	1.30	90	10/3/75
	V280	S	90	2.90	2.90	851	15.30	15.30	660	14.60	14.60	1.20	90	10/7/75
Dome	D1-33	S F	89 89	1.95 2.25	4.20	841 836	6.70 6.90	13.60	661 656	5.80 6.15	11.95	1.35	89 89	10/27/75 10/27/75
	D1-51	S F	91 90	1.40 1.70	3.10	851 846	5.70 5.45	11.15	681 678	4.80 5.15	9.95	0.90	90 90	10/28/75 10/28/75
	D2-21	S F	90 91	1.90 1.65	3.55	846 851	7.25 6.30	13.55	667 639	6.30 5.70	12.00	1.20	90 90	10/22/75 10/22/75
	D2-49	S F	90 91	2.00 1.55	3.55	846 851	6.00 6.25	12.25	655 633	5.10 5.25	10.35	1.20	90 90	10/21/75 10/21/75
	D3-40	S F	90 91	1.70 2.25	3.95	846 851	6.55 7.15	13.70	659 664	5.65 6.10	11.75	1.55	90 90	10/17/75 10/17/75
	D3-49	S F	89 89	1.25 1.75	3.00	837 842	6.00 5.25	11.25	652 679	5.00 5.00	10.00	0.90	89 89	10/15/75 10/15/75
Hoop	49AE	S F	90 90	2.55 2.75	5.30	846 851	7.70 7.85	15.55	683 675	7.00 7.20	14.20	1.55	90 90	12/2/75 12/2/75
	59BD	S F	87 87	4.00 4.20	8.20	818 823	9.20 9.55	18.75	653 664	8.55 8.85	17.40	2.25	87 87	11/17/75 11/17/75
	63BD	S F	90 90	2.45 0.90	3.35	846 851	6.60 6.70	13.30	703 668	5.98 5.90	11.88	1.03	90 90	11/18/75 11/18/75
	80BD	S F	90 90	1.80 1.95	3.75	846 851	6.90 6.80	13.70	641 665	6.05 6.05	12.10	1.15	90 90	11/19/75 11/19/75
	66BF	S F	90 90	2.40 1.85	4.25	846 851	7.25 7.30	14.55	671 672	6.55 6.60	13.15	1.35	90 90	11/24/75 11/24/75
	71BF	S F	90 90	2.25 2.65	4.90	846 851	7.45 7.80	15.25	688 663	6.75 6.90	13.65	1.50	90 90	11/25/75 11/25/75
	79BF	S F	90 90	2.40 2.25	4.65	836 841	7.75 7.40	15.15	676 670	6.95 6.70	13.65	1.80	89 89	11/26/75 11/26/75
	56DF	S F	89 89	3.70 3.55	7.25	841 836	8.80 8.80	17.60	657 659	8.20 8.40	16.60	1.90	89 89	10/30/75 10/30/75
	68DF	S F	91 90	2.20 2.60	4.80	851 846	7.55 7.40	14.65	672 685	6.75 6.80	13.55	1.25	90 90	11/4/75 11/4/75
	76DF	S F	91 90	1.80 2.10	3.90	851 846	7.55 7.00	14.55	638 666	6.55 6.20	12.75	1.20	90 90	11/5/75 11/5/75

* Elongation is defined here as the distance from bearing plate to anchor head.

** Total elongation is the sum of elongations at the two ends.

*** Increase in tendon elongation between detensioning and retensioning.

TABLE 7.1 — SUMMARY OF FORCE AND ELONGATION DATA DURING RETENSIONING

APPENDIX A

Technical Specifications Test Procedure

Surveillance Testing of Containment Building
Post-Tensioning System

Procedure Number TSF-2, Rev.0

Palisades Nuclear Plant

Consumers Power Company

Rev. 11
9/11/75

Controlled Copies



Consumers Power Company

INTERNAL CORRESPONDENCE

cc Bechtel Corp (5)
ERCooper, Jackson
RWRogness, Jackson

EMMcKernan, Jackson
FBayer, Connesco
REMcCaleb, Palisades

The following (procedures) (portions of procedures) is/are authorized to be utilized by the Plant Maintenance or Operations Department, taking into account plant conditions and other considerations as listed.

Technical Specifications Test Procedure - Surveillance Testing of Containment Building Post-Tensioning System

Procedure: Permanent/~~Temporary~~

Procedure Number TSF-2

Revision Number Rev. 0

Date 9-23-75

Author SPDonner

Section All

PRC Review Date 9-23-75

Revision 0 Author SPDonner

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K. W. Berry

GHHein/GBSlade/KWBerry
Plant Maint./Oper./Tech. Supt.

JGLewis
Plant Superintendent

Additional Considerations:

TECHNICAL SPECIFICATIONS TEST PROCEDURE
SURVEILLANCE TESTING OF
CONTAINMENT BUILDING POST-TENSIONING SYSTEM

1.0 PURPOSE

- 1.1 This procedure presents the requirements for testing the containment building post-tensioning system. Post-tensioning tendon lift-off forces are to be determined for selected surveillance tendons. Inspection for corrosion on anchor hardware and sample wires will be performed; and tensile strength tests on sample wire specimens and chemical tests on filter grease will also be conducted. Collected data and information will be evaluated to determine adequacy of the system in contributing to structural integrity.

2.0 REFERENCES

- 2.1 Technical Specifications Sec. 4.5.4.
2.2 Bechtel Associates Surveillance Procedure for Containment Building Post-Tensioning System, Rev. 1-A.

3.0 ACCEPTANCE CRITERIA

- 3.1 The measured lift-off force per tendon shall not be more than 815 kips per tendon nor less than 584 kips per dome tendon or 615 kips per vertical and hoop tendons.
3.2 Inspection wires shall indicate no significant loss of section by corrosion or pitting.
3.3 Wire specimens cut from inspection wires shall not fail during tensile test at less than 11.78 kips per wire (minimum ultimate wire strength.)
3.4 Tendon anchorage hardware shall be free of significant corrosion, pitting, cracks or other deleterious effects.

4.0 INITIAL CONDITIONS

None.

5.0 PRECAUTIONS

- 5.1 Instructions for the safety of testing personnel and test equipment will be the responsibility of the contractor hired to perform the testing.

6.0 LIMITS

- 6.1 Tendon tensioning force shall not be allowed to exceed 80% of the specified minimum ultimate strength of the wire (0.8 x 240 ksi, or 9.43 kips per effective wire).

PRC 9-23-75

APPR *H. [signature]*

7.0 PROCEDURE

(See attached Bechtel Associates Surveillance Procedure for Containment Building Post-Tensioning System, Rev. 1-A.)

Raw data and final report shall be placed in the Technical Specifications Testing File.

8.0 APPENDICES

None.

PRC 9-23-75

APPR *Hein*

SURVEILLANCE PROCEDURE
FOR
CONTAINMENT BUILDING POST-TENSIONING SYSTEM

CONSUMERS POWER COMPANY
PALISADES NUCLEAR PLANT

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July 1975

Revision 1 Date: August 22, 1975
Revision 1-A September 17, 1975

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APPENDICES

A	Procedure For Calibration Of Hydraulic Rams And Pressure Gages
B	Procedure For Calibration of Wire Test Machine Ram
C	Surveillance Data Forms
D	Procedure For Testing Of 100-Inch Gage Length Wire Specimens
E	Procedure For Laboratory Testing Of Sheathing Filler
F	Required Submittals

FIGURES

- 1 Go, No-Go Gage
- 2 Wire Puller
- 3 WirePuller-Details
- C-1 Sheathing Filler Removal And Installation
- C-2 Detensioning And Retensioning Data
- C-3 Tendon Wire Anchorage System
- C-4 Tendon Wire Inspection
- C-5 Tendon Wire Test
- C-6 Calculation - .8 Ultimate Strength and Pressure
- D-1 Wire Test Assembly
- D-2 Wire Test Anchor Head
- F-1 Required Submittals



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1.0 PURPOSE

This procedure specifies the items to be performed to obtain data to access the quality and structural performance of the containment post-tensioning system.

2.0 SCOPE

This procedure satisfies the requirements of the Technical Specifications for Palisades Plant FSAR, Section 4.5.4, (License Amendment No. 14, Change No. 18).

Each surveillance shall consist of the following:

- (a) Visual and laboratory examination of sheathing filler.
- (b) Inspection of anchor assembly for deleterious conditions such as corrosion, cracks, missing wires, or off-size button-heads.
- (c) Measuring height of existing shim stack (clear distance between bearing plate and anchor head on field end or bushing on shop end).
- (d) Measuring lift-off force.
- (e) Detensioning tendons and checking wire continuity by pulling each wire and observing its movement at the opposite end.
- (f) Removal of a minimum of one wire from three selected surveillance tendons, one from each group; hoop, vertical, and dome, for examination and testing. Consumers Power Company shall select the three tendons from which wires are to be removed.
- (g) Visual inspection of concrete surrounding the bearing plates of all surveillance tendons.

1

- (h) Retensioning tendons to lift-off force measured in item (d) above less the effect of any wires removed and measuring corresponding tendon elongation.
- (i) Visual inspection of wires removed from tendons.
- (j) Testing of wires removed from tendons for yield and ultimate strength and percent elongation.
- (k) Evaluation of test and inspection results to assess the general condition of the post-tensioning system and evaluate time-dependent factors such as prestress losses and corrosion.

The elapsed time between removal and replacement of sheathing filler from each tendon shall not exceed three weeks; during this period, tendon end anchors shall be protected with Viscosity Oil Company Visconorust 2090P or approved equal.

If tendon surveillance is conducted during plant operation, no more than one surveillance tendon shall be detensioned at any given time. In the event that adjacent tendons must be checked, the original surveillance tendon shall be retensioned.

3.0 SURVEILLANCE TENDONS

Consumers Power Company will select ten (10) hoop tendons, six (6) dome tendons, and five (5) vertical tendons from the following tendons for the five year tendon surveillance as follows (random first selections are circled below; if interferences are found from a surveillance standpoint, use alternate tendons in list below):

Hoop Tendons:

(29DF)	(46BD)	58BF	34EA
41DF	59BD	(64BF)	(49EA)
(56DF)	(63BD)	(71BF)	67EA
68DF	74BD	(79BF)	83EA
(76DF)	(80BD)		

Vertical Tendons:

V12	V120	V202	V304
V36	V128	V224	V322
V64	V154	V248	V334
V86	V178	V280	

Dome Tendons:

D1L5	D2BH8	D3B3
D1L19	D2BH21	D3T18
D1L33	D2BL31	D3B25
D1L51	D2BL49	D3B49

4.0 INITIAL INSTALLATION AND PREVIOUS SURVEILLANCE DATA

Original records of tendon installation and subsequent surveillance shall be stored and maintained by the Consumers Power Company. These records are stored at the site. The initial installation data for the surveillance tendons and sheathing filler is given in the form of tendon pulling, buttonheading, tensioning and sheathing filler cards. Surveillance data is given in the form of surveillance reports and data recorded during surveillance.

5.0 DETENSIONING AND INSPECTION

5.1 Sheathing Filler

The sheathing filler, Visconorust 2090P, may be in liquid, gel, or solid form. Complete removal of sheathing filler is not required provided that all filler which has drained out or been removed during surveillance is replaced. Provisions shall be made to collect all filler which is removed in such a manner that the volume removed at each tendon is known. The sheathing filler removal and sampling procedure shall be as follows:

5.1.1 Record the containment exterior concrete temperature near the tendon.

5.1.2 Obtain two one-quart samples of sheathing filler from each surveillance tendon (one from each end).

Appropriately identify each sample.

△ A

- 5.1.3 Estimate the volume of sheathing filler removed from each tendon.
- 5.1.4 Perform the following sheathing filler tests in accordance with the requirements of Appendix E.

Test

- (a) Water Soluble Chlorides
- (b) Water Soluble Sulfides
- (c) Water Soluble Nitrates
- (d) Neutralization Number
- (e) Water Content By Weight


- 5.1.5 The test results shall be compared with previous test results and Appendix E, Section 1.0. The second sample from each tendon shall be tested only if the test results from the first sample exceed the values per Appendix E, Section 1.0.
- 5.1.6 Remove filler caps from both ends of tendon and compare color of filler to unused Visconorust 2090P supplied by Viscosity Oil Company. If tan colored filler is found, a representative sample of it shall be obtained. The tan color can be caused by heating the filler and entraining air in it or by emulsifying water in it. If after 24 hours of storage, the filler is still tan colored, it shall be analyzed as described in Section 5.1.4. Record observations on data sheet C-1 with appropriate footnotes.
- 5.1.7 Observe completeness of sheathing filler coverage on inside of filler cap, bearing plate, buttonheads, anchor head, bushing and shims immediately after removal of filler cap.

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5.2 Inspection Of Anchorage Components And Surrounding Concrete

The tendon end anchorage components shall be thoroughly cleaned with Viscosity Oil Company Industrial Solvent No. 16. After cleaning, the components shall be inspected as follows:

- (a) Inspect buttonheads for shape and size, using Go, No-Go gage shown in Figure 1, and for cracks, corrosion and general appearance.
- (b) Inspect the anchor head, bushing, shims, and bearing plate for corrosion and cracks.
- (c) The results of the above inspections [5.2(a) and (b)] shall be recorded on Figure C-3.

Sketches describing any cracks, off-size, missing, or unusual buttonheads or variation in corrosion levels shall be prepared. A sample anchor head and buttonhead sketch is shown in Figure C-3. | 

The concrete surrounding the bearing plates of all surveillance tendons shall be checked visually where accessible for indications of abnormal material behavior. Cracks exceeding 0.01 inches shall be recorded on a sketch. The crack size is determined with an optical comparator and recorded in 0.005 inch increments. The concrete surveillance area shall be approximately 4 ft. long and 4 ft. wide.

5.3 Corrosion Level

Corrosion level for tendon surveillance shall be defined as follows:

**Corrosion
Level No.**

Description

1	Bright metal, no visible oxidation
2	Reddish brown color - no pitting
3	$0 < \text{pitting} \leq 0.003"$
4	$0.003" < \text{pitting} \leq 0.006"$
5	$0.006" < \text{pitting} \leq 0.010"$

The surveillance corrosion levels compare with initial field installation requirements as follows:

Corrosion Level		Corrosion Level Acceptability Criteria For Initial Field Installation
Surveillance	Field Installation	
1	A	Acceptable
2	B, C, D, E	Acceptable
3, 4, 5	F	Unacceptable



5.4 Calibration

All gages and rams used in detensioning and tensioning of surveillance tendons shall be calibrated in accordance with Appendix A before surveillance use. Gages and rams will not be calibrated after use unless damaged and repaired. Gages shall be checked for zero shift and damage prior to each use.





5.5 Tendon Detensioning Procedure

Detensioning shall be done from the same end(s) as original tendon tensioning. All data and events which occur during detensioning shall be recorded. The detensioning procedure shall be as follows:



- (a) Record the containment exterior concrete temperature near the tendon anchorage and the containment interior air temperature.



- (b) Assume the number of effective wires equal smallest number of buttonheads at either end of the tendon.
- (c) Measure existing shim stack within $\frac{1}{16}$ inch.
- (d) Attach the ram to the tendon end anchor. Attach the pressure gage to the ram, check it for damage, and adjust it to zero pressure reading. | 
- (e) During detensioning of dome and hoop tendons, an approximate equal force level shall be maintained on each tendon end at any given time. Use ram/gauge combination for which a corrected pressure versus force curve has been prepared. See Appendix A. | 
- (f) The lift-off force shall be measured repeatedly until three consecutive measurements fall within a range of 100 psig between the maximum and minimum of the three. Lift-off force is the minimum force at which all shims can be moved by pounding with a hammer (approximately 24 oz.). |  A
- (g) After the lift-off force is determined, the tensioning force can be increased to allow removal of shims, but shall not exceed 80% of the specified minimum ultimate strength of the wire (0.8x240 ksi) or 9.43 kips per effective wire. Record maximum gage reading prior to detensioning. | 
- (h) Remove all shims.
- (i) Reduce ram force to zero, detach pressure gage from ram, and detach the ram from the tendon end anchor.

5.6 Tendon Wire Inspection |

The tendon wires shall be inspected and surveillance wires removed as follows:

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- (a) Inspect each tendon wire for continuity by pulling one wire at a time and observing movement of the buttonhead at the other end. The tool for pulling individual wires is shown in Figures 2 and 3. Any discontinuous wires shall be shown on the Tendon Wire Anchorage Sketch (Figure C-3), removed, examined to determine cause of breakage, and tested in accordance with Section 5.7. These wires should not be considered as surveillance wire. 1
- (b) Consumers Power Company will select the vertical, hoop, and dome tendon from which one surveillance wire is to be removed for inspection and testing. In general, the wire should be removed from the first tendon of a group to be tested. Select and mark both ends of the surveillance wire and record its location on Figure C-3. The corresponding wire ends are identified by pulling at one end and observing which buttonhead moves at the other end. The surveillance wire shall not be removed from a tendon from which a surveillance wire was pulled in an earlier test. 1
- (c) Pull wire toward end to be cut and cut wire with wire cutter.
- (d) Remove the remaining portion of wire and clean it with Viscosity Oil Company Industrial Solvent No. 16 or approved equal. Inspect and sketch the wire, showing the location of any corrosion or damage and rating any corrosion as indicated in Section 5.3.
- (e) If the corrosion level exceeds Corrosion Level No. 4, a second wire shall be removed and inspected in accordance with Section 5.6(d) above. 1

5.7 Wire Testing

Strength and elongation tests shall be performed on the removed wires. One tensile test specimen shall be taken from each end of the wire and one at mid-length. Length of wire specimens shall be a minimum 101 inches long. Additional specimens shall be taken from areas which have a corrosion rating two or more levels greater than the average corrosion level of the wire. In any event, a specimen shall be taken in the area exhibiting the greatest corrosion of any surveillance wire removed. Tensile tests shall also be made on at least two specimens from each broken wire removed. The test specimens shall be taken from near the wire break and shall be 101 inches long. Tag and identify specimen immediately before cutting. The wire test procedure shall be in accordance with Appendix D. Surveillance wire material not used for test specimens shall be protected from corrosion until tensile test results are found acceptable.

6.0 RETENSIONING TENDONS

Retensioning shall be done from the same end(s) as original tendon tensioning. All data and events which occur during retensioning shall be recorded. The retensioning procedure shall be as follows:

- (a) The number of effective wires is the number of continuous wires in the tendon during retensioning.
- (b) Attach the ram to the tendon anchorage. Attach the pressure gage to the ram, check it for damage, and adjust it to zero pressure reading.
- (c) During retensioning of dome and hoop tendons, an approximate equal force level shall be maintained on each tendon end at any given time.
- (d) Record the containment exterior concrete temperature near the tendon anchorage and the containment interior temperature.

- (e) Increase tensioning force until average wire force is 1000 lbs. per wire and measure tendon force and the distance from the bearing plate to the inside face of the stressing washer at the field end, and the distance from the bearing plate to the inside face of the bushing at the shop end.
- (f) Increase tensioning force until average wire stress is 80% of the specified minimum ultimate strength ($0.8f_{pu}$) of the wire (9.43 kips per effective wire).^{*} Record the maximum tensioning force and the corresponding distances between bearing plate and tendon anchor as defined in paragraph 6.0(e). If the measured distance $>$ or $<$ the original shim stack height [Section 5.5(c)] by more than 50%, the tendon shall be detensioned and an engineering evaluation shall be made to determine the cause of the higher than expected elongation. | \triangle A
- (g) Install sufficient shims to obtain lift-off force equal to that measured in Section 5.5(f) (tolerance plus 3%, minus 3%), less the effect of any reduction in the number of effective wires. Reduce ram pressure to zero. Lift-off force shall be determined as described in Section 5.5(f). If the tensioning force drops below the desired lift-off force, the tendon force shall again be increased until average wire stress is $0.8f_{pu}$ before installation of additional shims. | \triangle A
- (h) Detach the ram and apply a coating of Visconorust 2090P (or approved equal) to the tendon end anchorage.
- (i) Measure new shim stack within $\frac{1}{16}$ inch.

7.0 RESEALING TENDONS

The tendon resealing procedure shall be as follows:

- (a) Install tendon filler caps using new gaskets and gasket sealant as used during construction or approved equal.

^{*}Refer to Fig. C-6 for calculation of 0.8 ultimate tensile strength and corresponding ram gage reading. | \triangle A

- (b) Refill the tendon system with Viscosity Oil Company Visconorust 2090P sheathing filler, or approved equal. The temperature of the sheathing filler at the pump shall be approximately 150°F. Do not reuse filler which has been removed from the tendon. The filling procedure shall be similar to that used during initial installation or approved equivalent, utilizing all accessible valves, vents and drains. Pumping shall continue until at least five (5) gallons of filler without any air bubbles has come out of the outlet or vent farthest from the pump. △
- (c) If less than five gallons of filler has been removed at each tendon end, filler may be replaced by pumping or pouring into each end, provided each end is vented to bleed out air.
- (d) Estimate the temperature and volume of sheathing filler installed in each tendon, and verify that removed amount is replaced.

8.0 EVALUATION AND CORRECTIVE ACTION

8.1 Lift-Off Forces

- 8.1.1 The following is the criteria that constitutes tendon lift-off acceptability:

The measured lift-off force per tendon shall not exceed 815 kips per tendon, nor less than 584 kips per tendon for dome tendons, or 615 kips per tendon for hoop and vertical tendons.

8.1.2

If one of the 21 surveillance tendons fails to meet the minimum and maximum force criteria per Section 8.1.1, an adjacent tendon on each side of that tendon shall be tested and considered as surveillance tendons. If both of these tendons meet the criteria, then the tendon surveillance program shall proceed considering the single deficiency as unique and acceptable. However, if either adjacent tendon △

fails to meet the criteria per Section 8.1.1, or if more than one of the 21 surveillance tendons fail to meet the acceptance criteria, the Nuclear Regulatory Commission (NRC) shall be notified in accordance with Section 9.0.

8.2 Wire Tensile Strength

8.2.1

Failure at less than 11.78 Kips of any one of the test samples requires reporting in accordance with Section 9.0 of this procedure.

8.3 Wire Corrosion

8.3.1

Significant wire corrosion shall be deemed any which allows a tested wire to fall below the guaranteed minimum ultimate tensile strength (11.78 Kips per wire) and shall be reportable in accordance with Section 9.0.

8.4 Anchorage Hardware Corrosion

8.4.1

Areas of unusual, suspect, or significant corrosion or deterioration of the anchorage hardware shall be noted by the inspector and brought to the attention of the owner. The owner will make the determination of which noted areas are significant and reportable under Section 9.0.

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9.0 DATA REPORTING AND RECORDING

9.1

Any indication of abnormal degradation of the post-tensioning system shall be reported to the Nuclear Regulatory Commission within ten (10) days of the completion of the tests. This report shall be in conformance with NRC Regulatory Guide 1.16, "Reporting of Operating Information".

9.2

A copy of all surveillance data obtained during any working day shall be submitted to Consumers Power Company or its agent on the same day.

9.3

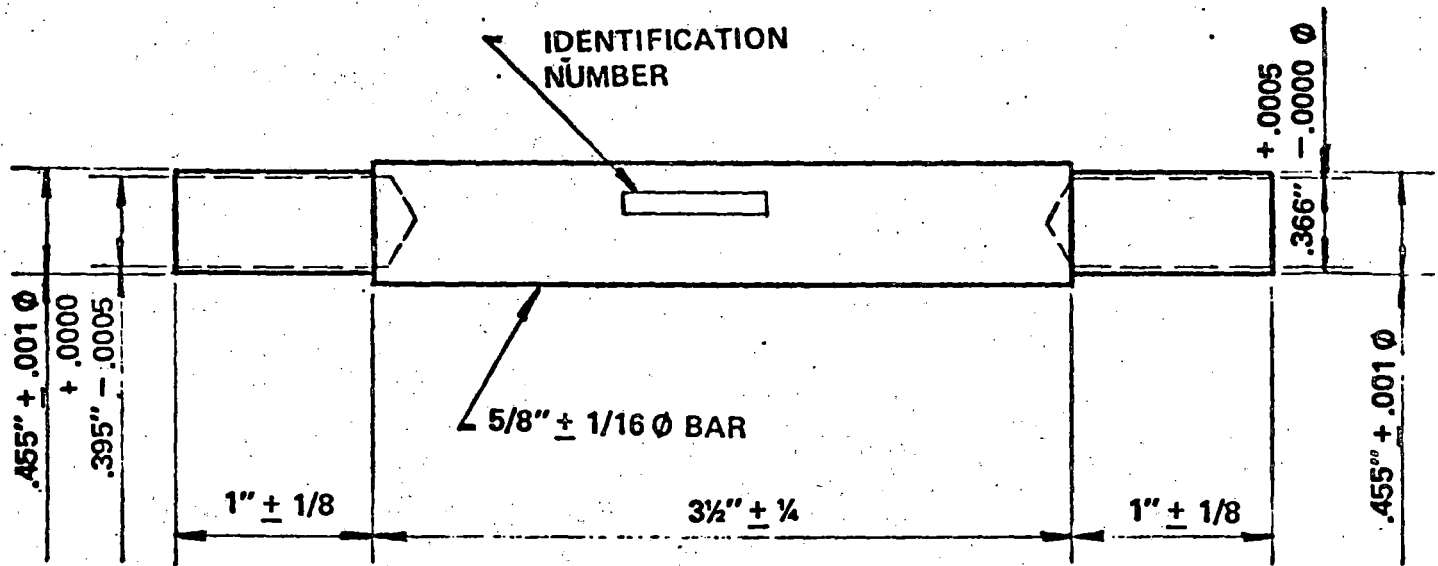
A field report shall be prepared.

9.4

A final report documenting the results of all tests and inspections performed during surveillance and the conclusions gained from these results shall be submitted to the Nuclear Regulatory Commission within 90 days of the completion of the tests (by Consumers Power Company or other designated party).

9.5

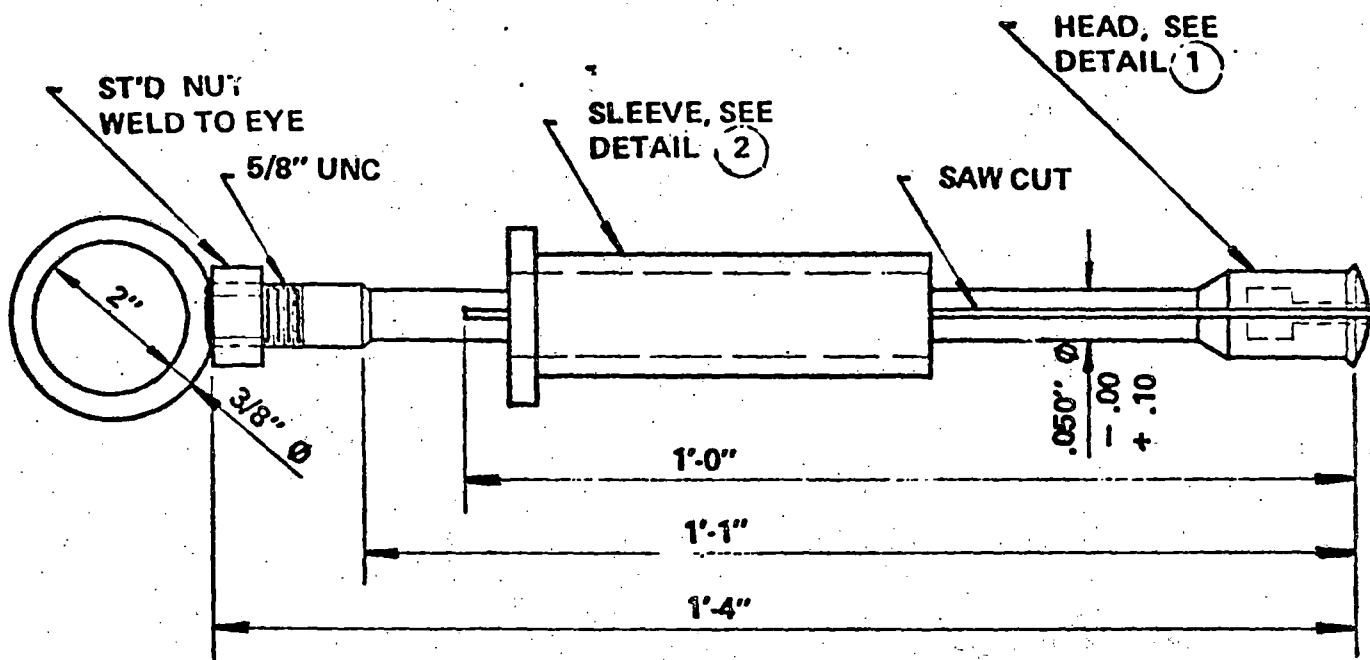
The original raw data of the surveillance shall be maintained by Consumers Power Company in the plant records.



- NOTES:
1. GAGE SHALL BE HEAT TREATED TO ROCKWELL C62-67.
 2. HOLES SHALL BE SIZED AFTER HEAT TREATING.
 3. HOLE DIAMETER SHALL BE CERTIFIED PRIOR TO EACH SURVEILLANCE.
 4. EACH GAGE SHALL HAVE AN IDENTIFYING NUMBER.

FIGURE 1 Go, No-Go GAGE
PALISADES PLANT - TENDON SURVEILLANCE

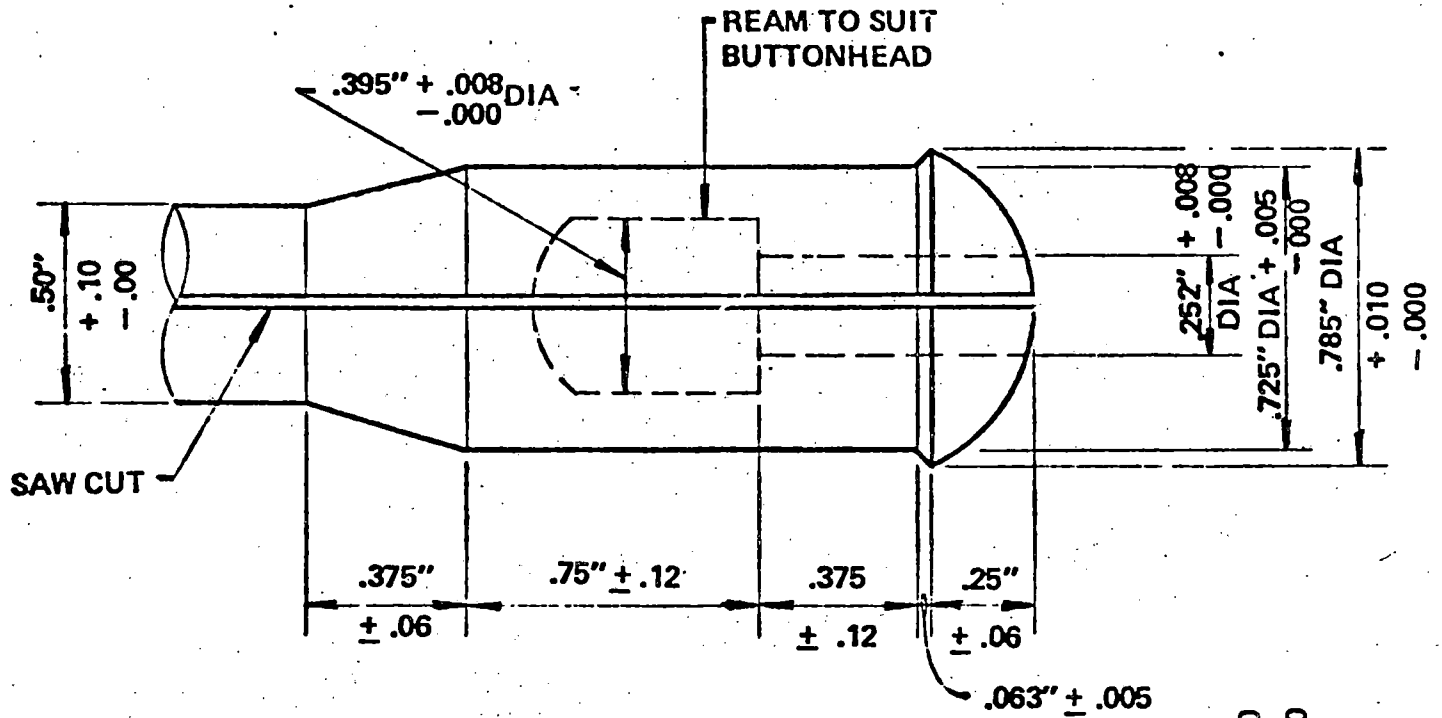
INFORMATION COPY



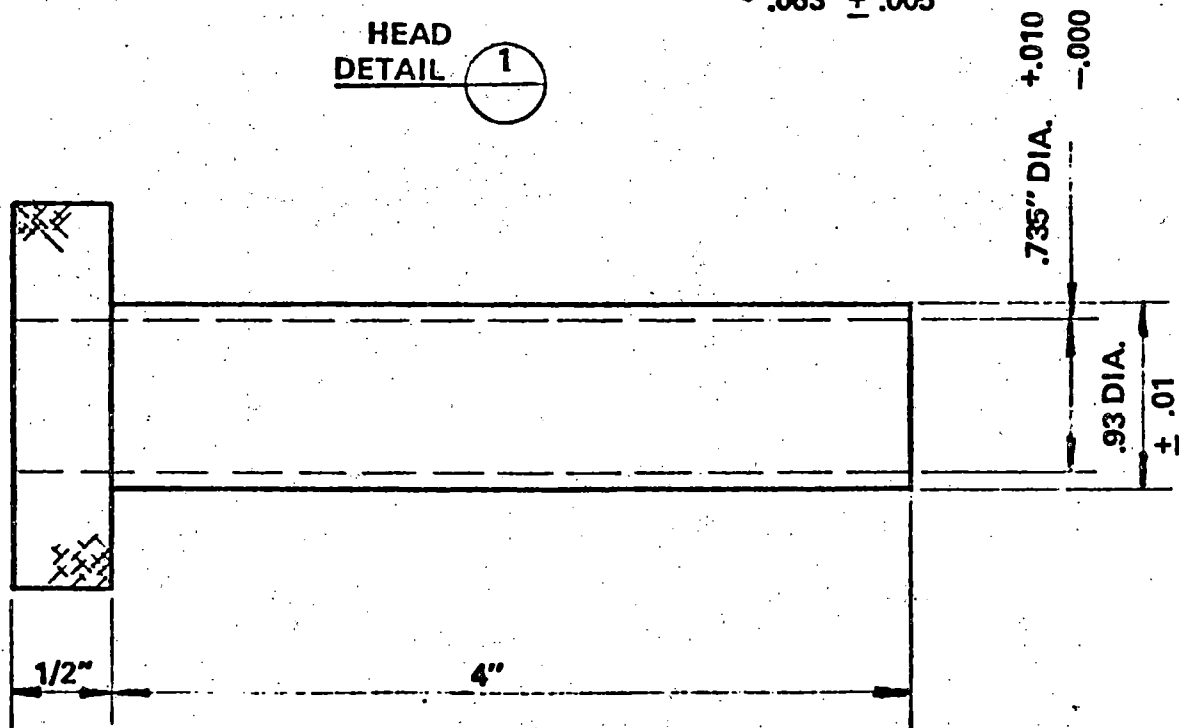
NOTES:

1. The nut with the pulling ring welded to it may be replaced with an eye nut.
2. The anchor head must be pushed into the trumpet to give a clear distance of at least one foot between buttonheads and anchor head in order to use this tool. This permits the wires to move apart so that the tool will slip over the buttonheads.
3. The hardness of this tool shall not exceed Rockwell C40.

**FIGURE 2 WIRE PULLER - PALISADES PLANT
TENDON SURVEILLANCE**



HEAD
DETAIL 1



MOVABLE SLEEVE
DETAIL 2

FIGURE 3 WIRE PULLER - DETAILS
PALISADES PLANT - TENDON SURVEILLANCE

APPENDIX A

**PROCEDURE FOR
CALIBRATION OF HYDRAULIC RAMS
AND PRESSURE GAGES**

INFORMATION COPY

1.0 GENERAL

This document specifies the general procedures which shall be used for calibration of the hydraulic rams and pressure gages under increasing tensile loads for various ram extensions. This document does not relieve the supplier of responsibility for conducting this calibration in a manner consistent with industry standards.

Calibration of the hydraulic ram shall be performed in accordance with Section 2.0. Calibration of the gages shall be in accordance with Section 3.0. A report meeting the requirements of Section 4.0 shall also be prepared.

The following items shall be supplied:

- (1) Load cell and strain measuring equipment with calibration traceable to the National Bureau of Standards.
- (2) Bearing plates, threaded rods and nuts required to transmit concentric loads to the ram.
- (3) Two hydraulic rams with corresponding pumps.
- (4) One master gage.
- (5) Four pressure gages.
- (6) Dead weight tester.

2.0 RAM CALIBRATION PROCEDURE

2.1 Test Set Up

The load cell shall be centered such that the loads are applied concentrically and with the same distribution as for calibration of the load cell.

2.2 Loading Sequence

The two rams (numbered Ram No. 1 and Ram No. 2) shall be calibrated for increasing pressures from zero to a pressure corresponding to a force of 900,000 lbs. in 100,000 lb. force increments. A minimum of two runs each, at approximate $\frac{1}{4}$ total ram extension and $\frac{3}{4}$ total ram extension, shall be made for each ram.

2.3 Master Gage

During the calibration of the rams, a master gage shall be used to establish the relationship between tensioning force and master gage pressure readings. The master gage shall be calibrated for increasing pressures with a dead weight tester prior to calibration of rams.

3.0 PRESSURE GAGE CALIBRATION PROCEDURE

Four pressure gages (numbered 1 through 4) shall be calibrated for increasing pressures starting from zero in 500 psig increments up to a pressure equal to or larger than 900,000 lbs., divided by the effective ram area. Two runs shall be performed for each gage.

4.0 CALIBRATION REPORT

A report shall be submitted within one week of completion of calibration.

4.1 Report Contents

The calibration report shall contain the following:

- (1) Load cell calibration showing true versus measured load for the load range used for ram calibration. Calibration shall be traceable to the U.S. Bureau of Standards.

- (2) Data recorded for each run performed for ram and gage calibrations.
- (3) Prepare corrected pressure versus force curves for Ram No. 1 with gages No. 1 and 2, and for Ram No. 2 with gages 3 and 4.

4.2 Distribution

Distribution of the calibration report shall be made in accordance with the requirements of Appendix F.

INFORMATION COPY

APPENDIX B

**PROCEDURE FOR
CALIBRATION OF WIRE TEST MACHINE RAM
AND PRESSURE GAGES**

INFORMATION COPY

1.0 GENERAL

This document specifies the general procedures which shall be used for calibration of the tendon wire test machine ram and gages under increasing tensile loads for various ram extensions. This document does not relieve the supplier of responsibility for conducting his calibration in a manner consistent with industry standards.

Calibration of the wire test machine ram shall be performed in accordance with Section 2.0. Calibration of the gages shall be in accordance with Section 3.0. A report meeting the requirements of Section 4.0 shall also be prepared.

The following items shall be supplied:

- (1) Load cell and strain measuring equipment with calibration traceable to the National Bureau of Standards or a calibrated testing machine traceable to the National Bureau of Standards.
- (2) Bearing plates, threaded rods and nuts required to transmit concentric loads to the ram.
- (3) Wire test machine rams to be provided by Consumers Power Company or other designated party.
- (4) One master gage.
- (5) Two pressure gages.
- (6) Dead weight tester.

2.0 WIRE TEST MACHINE RAM CALIBRATION PROCEDURE

2.1 Test Set Up

The wire test machine ram shall be centered such that the loads are applied concentrically.

2.2 Loading Sequence

The wire test machine ram shall be calibrated for increasing pressure from zero to a pressure corresponding to a force of 16,000 lbs. in 2000 lb. force increments. A minimum of two runs each, at approximately $\frac{1}{4}$ total ram extension and $\frac{3}{4}$ total ram extension shall be made.

2.3 Master Gage

During the calibration of the rams, a master gage shall be used to establish the relationship between tensioning force and master gage pressure readings. The master gage shall be calibrated for increasing pressures with a dead weight tester prior to calibration of the wire test machine ram.

3.0 PRESSURE GAGE CALIBRATION PROCEDURE

Two pressure gages, (numbered 5 and 6) shall be calibrated for increasing pressures starting from zero in 500 psig increments up to a pressure equal to no larger than 16,000 lbs. divided by the effective ram area. Two runs shall be performed for each gage.

4.0 CALIBRATION REPORT

A calibration report shall be submitted within one week of completion of calibration.

4.1 Report Contents

The calibration report shall contain the following:

INFORMATION COPY

- (1) Load cell or testing machine calibration showing true versus measured load for the load range used for ram calibration. Calibration shall be traceable to the National Bureau of Standards.
- (2) Data recorded for each run performed for ram and gage calibrations.
- (3) Prepare corrected pressure versus force curves for the ram with gages No. 5 and 6.

4.2 Distribution

Distribution of the calibration report shall be in accordance with the requirements of Appendix F.

APPENDIX C

SURVEILLANCE DATA FORMS

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	
(2) TENDON END LOCATION	

FILLER REMOVAL RECORDED BY _____

1

(3) DATE REMOVAL STARTED	
(4) CONTAINMENT EXTERIOR CONCRETE	
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	
(6) SAMPLE TAKEN	

FILLER CAP

(7) DATE REMOVED	
(8) DATE INSTALLED	

FILLER INSTALLATION RECORDED BY _____

1

(9) DATE INSTALLED	
(10) CONTAINMENT EXTERIOR CONCRETE	
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	
(13) TOTAL VOLUME INSTALLED (GAL)	
(14) INSTALLATION PRESSURE (PSI)	

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

INFORMATION COPY

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. _____	(2) LOCATION _____	(3) DATE _____
(4) JACK No. _____	(5) GAGE No. _____	(6) No. EFF. WIRES AT DETENSIONING _____

DETENSIONING (9) RECORDED BY _____
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE		
(9) CHECK GAGES (ZERO)		
(10) MEASURE SHIMS (INCH)		
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) PSIG	
	(2) PSIG	
	(3) PSIG	
	AVG. PSIG	KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)		
(12) DEPRESSURIZE TO ZERO		
(13) REMOVE RAM		
(14) WAS INSPECTION WIRE CUT AT THIS END?		
(15) CHECK CONTINUITY		

RETENSIONING (16) RECORDED BY _____

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING		
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE		
(19) CHECK GAGES (ZERO)		
(20) PRESSURIZE TO 1000 LB/WIRE (PSI)		
(21) MEASURE ELONGATION** (INCH)		
(22) PRESSURIZE TO $.8f_{pu}$ (PSI)		
(23) MEASURE ELONGATION AT $.8f_{pu}$		
(24) SHIM TO NEW LIFT-OFF*		
(25) DEPRESSURIZE TO ZERO		
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) PSIG	
	(2) PSIG	
	(3) PSIG	
	AVG. PSIG	KIPS
(27) MEASURE NEW SHIMS (INCH)		

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

FIVE YEAR TENDON SURVEILLANCE

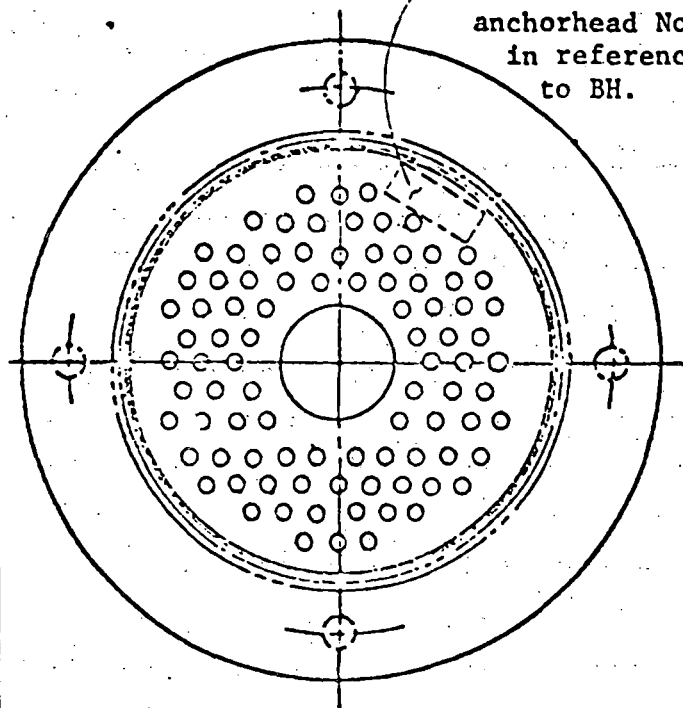
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification _____

Date: _____ By: _____

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End

Field End

Anchor Location	
-----------------	--

Filler Coverage

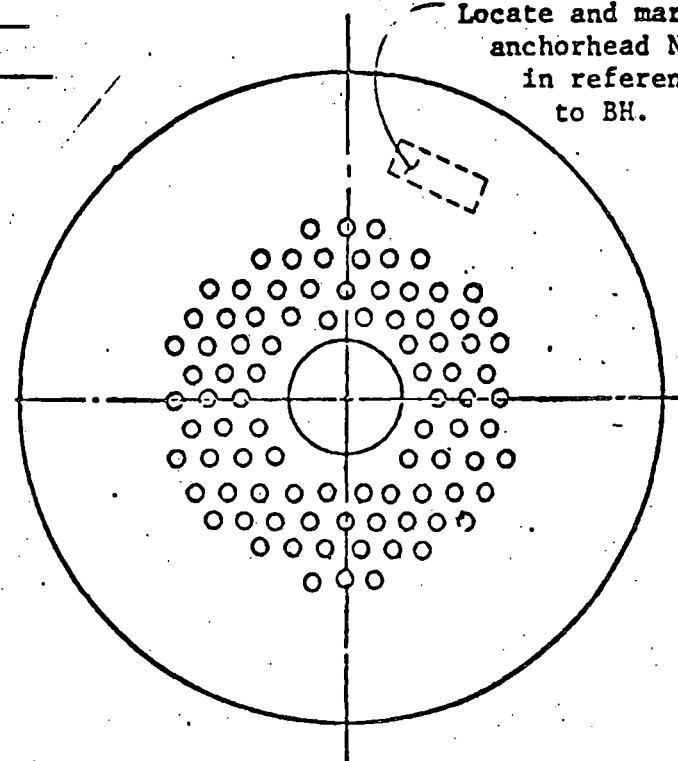
Cap	
Buttonheads	
Anchor Head	
Bushing	
Shims	
Bearing Plate	
No. Off-Size BH	
No. of Split BH	

Corrosion Level

Button Heads	
Anchor Head	
Bushing	
Shims	
Bearing Plate	

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ✕ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ◐ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

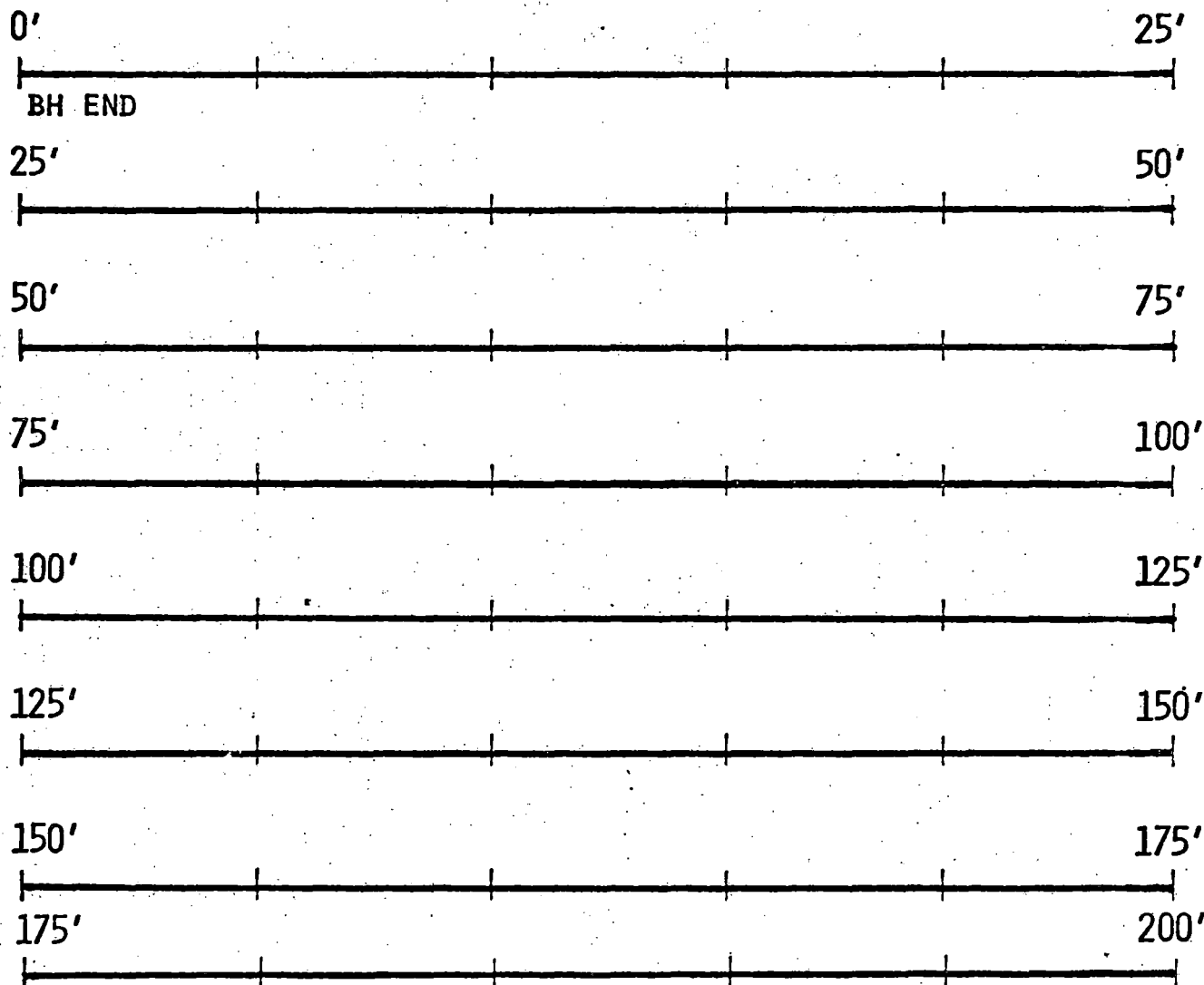
LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} < .003"$
- #4 $.003" < \text{pitting} < .006"$
- #5 $.006" < \text{pitting} < .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION _____
DATE TENDON INSPECTED _____ By _____
WIRE LENGTH (FT) _____



CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .006''$
#5 $.006'' < \text{PITTING} \leq .010''$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	
(2) SAMPLE NUMBER	
(3) DATE WIRE TESTED	
(4) DATA RECORDED BY:	
(5) MEASURE WIRE DIAMETER (IN)	
(6) MEASURE GAGE LENGTH (IN)	
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	
(9) INCREASE PRESSURE TO PSIG*	
(10) ZERO LOAD	
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	
(16) RECORD RULER READING AT FAILURE (IN)	
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

FIGURE C-5 TENDON WIRE TEST

INFORMATION COPY

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number _____

Calculation By _____

Calculation Checked By _____

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X _____ = _____ lb

Pressure = Force ÷ Ram area

Shop end: Ram # _____ Gage # _____ Ram Area _____ in²Pressure = _____ lb ÷ _____ in² = _____ psiField end: Ram # _____ Gage # _____ Ram Area _____ in²Pressure = _____ lb ÷ _____ in² = _____ psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = _____ psi X _____ = _____ psi

Field end:

Pressure = _____ psi X _____ = _____ psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = _____ psi X _____ = _____ psi

Field end:

Pressure = _____ psi X _____ = _____ psi

APPENDIX D

PROCEDURE FOR

TESTING OF

100-INCH GAGE LENGTH WIRE SPECIMENS

INFORMATION COPY

1.0 PROCEDURE FOR TESTING OF 100-INCH GAGE LENGTH WIRE SPECIMENS

The procedure for testing nominal 100-inch gage length specimens shall be as follows:

- (1) Cut each wire test specimen $100\frac{1}{2}$ inches long, insert two Wire Test Anchor Heads (Figure D-2), buttonhead each end of the test specimen, and prepare and attach identification tag.
- (2) Transfer specimen identification information from tag to data sheet.
- (3) Measure and record gage length and wire diameter.
- (4) Insert specimen in Wire Test Frame (Figure D-1) and check for proper setting of stressing washers in pulling adaptors.
- (5) Preload to 50 to 70 ksi in the wire to set the buttonheads in the stressing washer.
- (6) Release preload and stress wire to 29 ksi (0.1% elongation).
- (7) Preset dial gage to measure 0.9% elongation (0.9" in 100" gage length).
- (8) Obtain pressure reading when dial gage indicates a movement of 0.9% elongation (pressure at 1% elongation).
- (9) Remove dial gage and record rule reading at 1% (approximately 1") elongation.
- (10) Pull to failure recording maximum elongation and gage pressure reading.
- (11) Remove specimen and record type and location of break.

- (12) Calculate yield stress and ultimate stress from pressure reading at 1% elongation and failure utilizing gage calibration curves.
- (13) Calculate percent elongation under load at failure, based on actual gage length.

INFORMATION COPY

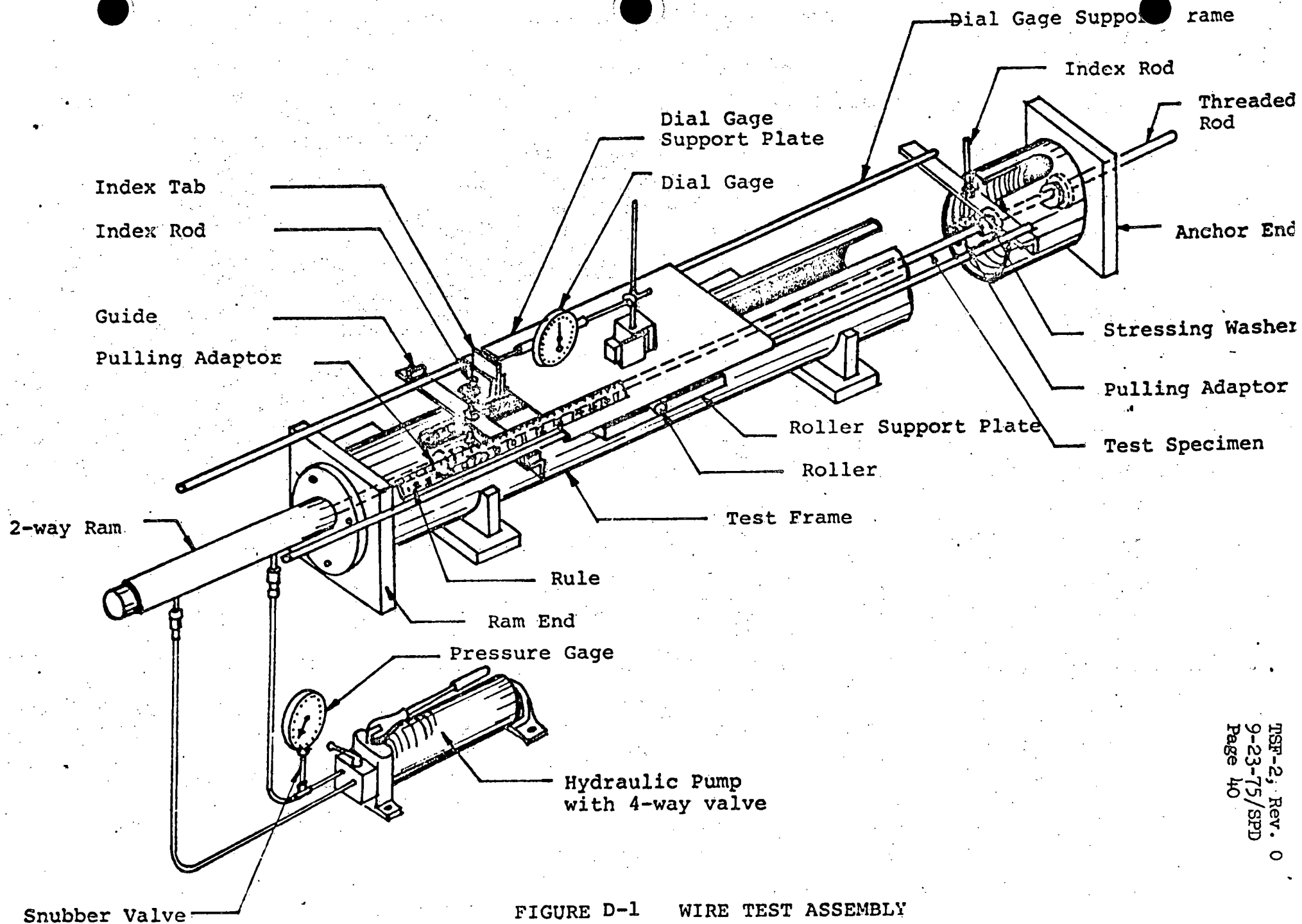


FIGURE D-1 WIRE TEST ASSEMBLY

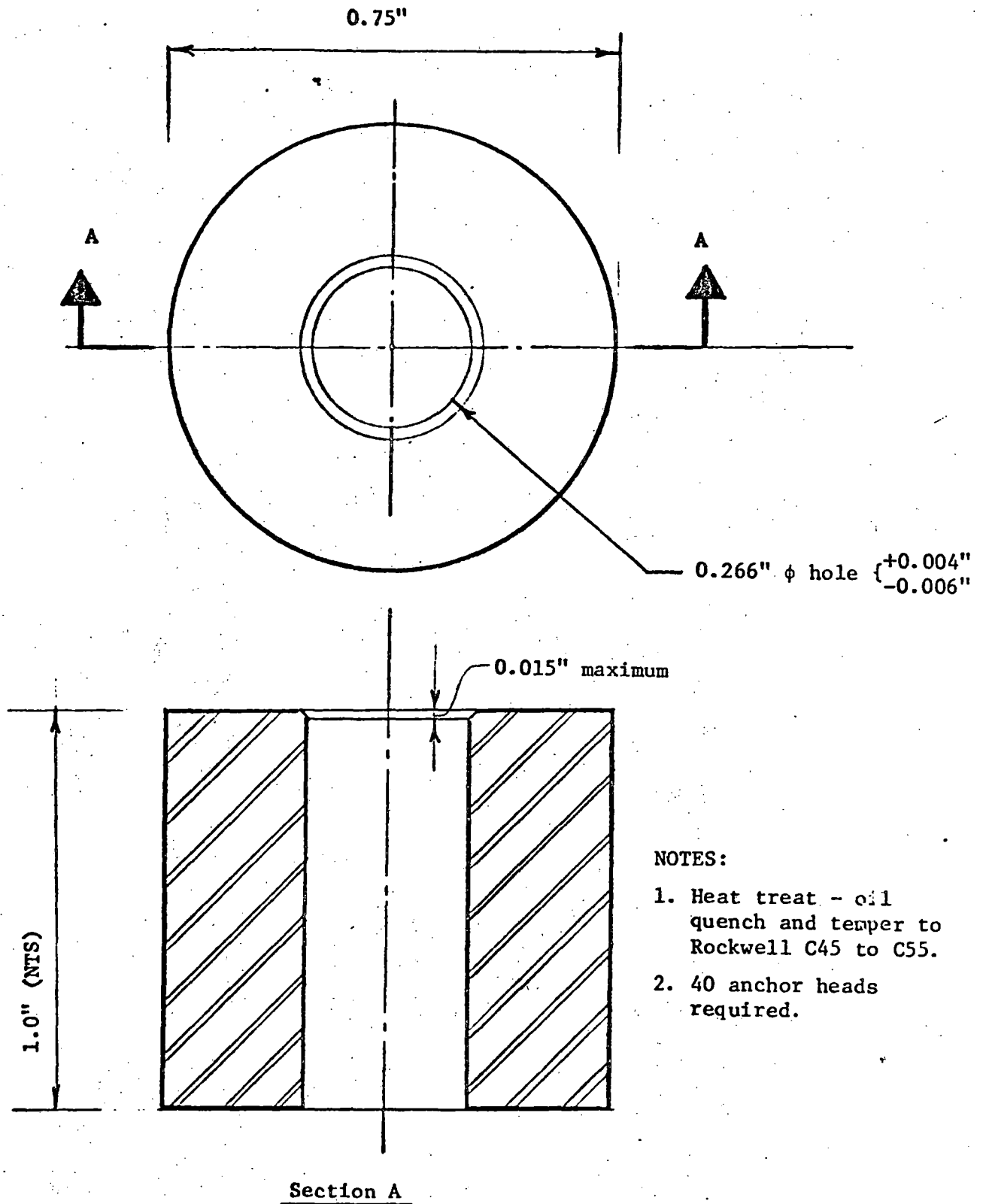


Figure D-2 Wire Test Anchor Head

APPENDIX E

**PROCEDURE FOR
LABORATORY TESTING OF
SHEATHING FILLER**

INFORMATION COPY

1.0 GENERAL

This document specifies the general procedures which shall be used for laboratory testing of tendon sheathing filler, Visconorust 2090P, to determine the concentrations of specified impurities. This document does not relieve the testing laboratory of responsibility for conducting the necessary laboratory tests in a manner consistent with industry standards.

The concentration of impurities in sheathing filler samples will likely not exceed the following:

- (1) Chlorides - 10 ppm
- (2) Nitrates - 10 ppm
- (3) Sulfides - 10 ppm
- (4) Neutralization number: Total acid number, mg KOH/g - 0.07
- (5) Water (H₂O) - 10% dry weight



A report meeting the requirements of Section 3.0 shall be prepared.

2.0 TEST DESCRIPTION

Each sample of sheathing filler shall be mixed and then tested as follows:

- (1) Chlorides (ppm CL) using ASTM D512-67 (1974).
- (2) Nitrates (ppm NO₃) using ASTM D992-71.
- (3) Sulfides (ppm S) using APHA (American Public Health Association), Test No. 228.
- (4) Water content (H₂O as percent of dry weight) using ASTM D95-70.
- (5) Neutralization number, using ASTM D664-58 (1968).

3.0 REPORT

A report shall be prepared containing the following information:

- (1) Sample identifications.
- (2) Concentration of chlorides, nitrates, and sulfides within an accuracy of 0.1 ppm.
- (3) Concentration of water (H_2O) within an accuracy of 0.1% of dry weight of filler.
- (4) Neutralization number within an accuracy of 0.01 mg reagent per gram of filler.

Distribution of the Laboratory Test Report shall be made in accordance with the requirements in Appendix F.

INFORMATION COPY

APPENDIX F

REQUIRED SUBMITTALS

Submittals shall be made in accordance with Figure F-1

Item	Number of Copies To Be Submitted To:	
	Consumers Power Co. Palisades Nuclear Plant Covert, Mi. 49043 Atten: Steve Donner	Bechtel Power Corp. P.O. Box 3965 (MET 34) San Francisco CA 94119 Atten: Bert Pfeifer
1. Calibration data for post-tensioning ram in accordance with Appendix A.	3	2
2. Calibration data for wire test machine ram in accordance with Appendix B.	3	2
3. Test data of laboratory testing of sheathing filler material in accordance with Appendix E.	3	2

Figure F-1 Required Submittals

To Holders of Plant Test Procedures

5/75

FROM Technical Superintendent

DATE Sept 24, 1975

SUBJECT Procedure TSF-2 Rev. No. 0

Title Tech Spec Test Procedure - Surveillance
of Containment Building Post-Tensioning System



Consumers
Power
Company

INTERNAL CORRESPONDENCE

CC Plant Review Committee

Expiration Date: Dec 31, 1975

TEMPORARY CHANGE #1

Paragraph No. 3.0 Figure No. _____ Table No. _____ System Check List No. _____

Page No. 8

INITIATOR SPDanner

☐ YES

Should this change be reviewed by PRC and issued as permanent?

☒ NO

The following is a temporary change in your procedure. At the next scheduled PRC meeting the change will be reviewed. If requested by the initiator, and if approved by the Plant Superintendent, it will be made a permanent change and issued in the normal manner.

Drop V-12 as a selected vertical tendon and
substitute V-36 (V-12 is inaccessible due the
exhaust stack and ladder landing)

Drop D1L5 and D3T18 as selected lower tendons
and substitute D1L33 and D3T40 respectively (D1L5
and D3T18 are located above the steam drums)

Drop V-224 and V-304 as selected tendons and
substitute V-202 and V-280 respectively (V-224
and V-304 are deflected tendons not suitable as
surveillance tendons)

Approved: K W Berry, Member PRC

Approved: [Signature] SS

To Holders of Plant Test Procedures

5/75

FROM Technical Superintendent

DATE Sept. 24, 1975

SUBJECT Procedure TSE-2 Rev. No. 0



Consumers
Power
Company

Title Tech Spec Test Proced - Surveillance
of Containment Building Post-Tensioning System

INTERNAL CORRESPONDENCE

CC Plant Review Committee

Expiration Date: Dec. 31, 1975

TEMPORARY CHANGE #2

Paragraph No. A-2.2 Figure No. _____ Table No. _____ System Check List No. _____

Page No. 24

INITIATOR: SPDanner

☐ YES

Should this change be reviewed by PRC and issued as permanent?

☒ NO

The following is a temporary change in your procedure. At the next scheduled PRC meeting the change will be reviewed. If requested by the initiator, and if approved by the Plant Superintendent, it will be made a permanent change and issued in the normal manner.

Change 900,000 in third line of Paragraph A-2.2
to 850,000

Change 1/4 in fourth line of Paragraph A-2.2
to 1/2

Change 500 in second line of Paragraph A-3.0
to 1000

Approved: K. Berry, Member PRC

Approved: W. J. Schwegel SS

To Holders of Plant Test Procedures

5/75

Technical Superintendent

DATE

October 13, 1975

SUBJECT

Procedure TSF-2 Rev. No. 0

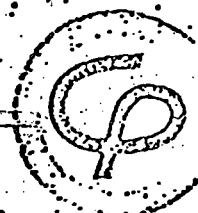
Title Tech Spec Test Proced - Surveillance
of Containment Building Post-Tensioning System

INTERNAL CORRESPONDENCE

CC

Plant Review Committee

Expiration Date: Dec 31, 1975



Consumers
Power
Company

TEMPORARY CHANGE #3

Paragraph No. 9.2 Figure No. _____ Table No. _____ System Check List No. _____

Page No. 18

INITIATOR

SP Donner

☐ YES

Should this change be reviewed by PRC and issued as permanent?

☒ NO

The following is a temporary change in your procedure. At the next scheduled PRC meeting the change will be reviewed. If requested by the initiator, and if approved by the Plant Superintendent, it will be made a permanent change and issued in the normal manner.

In 2nd line of Para. 9.2 delete "submitted" and
insert "made available"

To Holders of Plant Test Procedures

5/75

FROM Technical Superintendent

DATE

Oct 28, 1975

SUBJECT

Procedure TSF-2 Rev. No. 0

Title Tech Spec Proc - Surveillance

of Containment Building Post-Tensioning System

INTERNAL CORRESPONDENCE

CC

Plant Review Committee

Expiration Date: Dec 31, 1975



Consumers
Power
Company

TEMPORARY CHANGE #. 4

Paragraph No. 3.0 Figure No. _____ Table No. _____ System Check List No. _____

Page # 7

INITIATOR: SP Donner

☐ YES

Should this change be reviewed by PRC and issued as permanent?

☒ NO

The following is a temporary change in your procedure. At the next scheduled PRC meeting the change will be reviewed. If requested by the initiator, and if approved by the Plant Superintendent, it will be made a permanent change and issued in the normal manner.

Drop 29DF as a selected horizontal tendon
and substitute 68DF (29DF would require
positioning of the scaffold questionably close
to the 345 KV lines)

Approved: SP Donner

, Member PRC

Approved: L. J. Schaefer, SS

To Holders of Plant Test Procedures

5/75

FROM Technical Superintendent

DATE Nov 14, 1975

SUBJECT Procedure TSF-2 Rev. No. 0

Title Tech Spec Proced-Surveillance
of Containment Building Post-Tensioning System

INTERNAL CORRESPONDENCE

CC Plant Review Committee

Expiration Date: Dec 31, 1975

TEMPORARY CHANGE #5

Paragraph No. 3.0 Figure No. _____ Table No. _____ System Check List No. _____

Page # 7

INITIATOR: SP Donner

☐ YES

Should this change be reviewed by PRC and issued as permanent?

☒ NO

The following is a temporary change in your procedure. At the next scheduled PRC meeting the change will be reviewed. If requested by the initiator, and if approved by the Plant Superintendent, it will be made a permanent change and issued in the normal manner.

Drop 46 BD as a selected horizontal tendon
and substitute 59 BD

Approved: SP Donner, Member PRC

Approved: J. Brookhouse SS

To Holders of Plant Test Procedures

5/75

FROM - Technical Superintendent

DATE Nov. 24, 1975

SUBJECT Procedure TSE-2 Rev. No. 0

Title Test Spec Procedure - Surveillance

of Containment Building Post-Tensioning System

INTERNAL CORRESPONDENCE

cc Plant Review Committee

Expiration Date: Dec. 31, 1975



Consumers
Power
Company

TEMPORARY CHANGE #6

Paragraph No. 3.0 Figure No. _____ Table No. _____ System Check List No. _____

Page #7

INITIATOR _____

☐ YES

Should this change be reviewed by PRC and issued as permanent?

☐ NO

The following is a temporary change in your procedure. At the next scheduled PRC meeting the change will be reviewed. If requested by the initiator, and if approved by the Plant Superintendent, it will be made a permanent change and issued in the normal manner.

Drop 64 BF as a selected horizontal tendon
and substitute 66 BF (64 BF has 1/2 load cell
fitting on each end and ram extensions are
available for one end only

Approved: A. Danner, Member PRC

Approved: D. L. ...

APPENDIX B

Sheathing Filler Removal and Installation Data Sheets.

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-36
(2) TENDON END LOCATION	TOP - SHOP END

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

1

(3) DATE REMOVAL STARTED	9.29.75
(4) CONTAINMENT EXTERIOR CONCRETE	62°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	50 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	9.29.75
(8) DATE INSTALLED	9.30.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

1

(9) DATE INSTALLED	10.10.75
(10) CONTAINMENT EXTERIOR CONCRETE	64°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	108°
(13) TOTAL VOLUME INSTALLED (GAL)	70 GAL.
(14) INSTALLATION PRESSURE (PSI)	100 PSI

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-36
(2) TENDON END LOCATION	BOTTOM- FIELD

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

1

(3) DATE REMOVAL STARTED	9-25-75
(4) CONTAINMENT EXTERIOR CONCRETE	73°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	50 GAL.
(6) SAMPLE TAKEN	YES (2)

FILLER CAP

(7) DATE REMOVED	9.26.75
(8) DATE INSTALLED	9.30.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

1

(9) DATE INSTALLED	10.10.75
(10) CONTAINMENT EXTERIOR CONCRETE	72°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	108°
(13) TOTAL VOLUME INSTALLED (GAL)	70 GALS.
(14) INSTALLATION PRESSURE (PSI)	100 PSI

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-86
(2) TENDON END LOCATION	TOP - SHOP END

FILLER REMOVAL RECORDED BY H. S. GORAWSKI

1

(3) DATE REMOVAL STARTED	9.30.75
(4) CONTAINMENT EXTERIOR CONCRETE	62°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	55 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.1.75
(8) DATE INSTALLED	10.1.75

FILLER INSTALLATION RECORDED BY RTK

1

(9) DATE INSTALLED	10-20-75
(10) CONTAINMENT EXTERIOR CONCRETE	65°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	21 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-86
(2) TENDON END LOCATION	BOTTOM - FIELD

FILLER REMOVAL RECORDED BY F. B.

△

(3) DATE REMOVAL STARTED	9.29.75
(4) CONTAINMENT EXTERIOR CONCRETE	71°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	55 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	9.30.75
(8) DATE INSTALLED	10.1.75

FILLER INSTALLATION RECORDED BY H. S. GORAWSKI

△

(9) DATE INSTALLED	10.10.75
(10) CONTAINMENT EXTERIOR CONCRETE	72°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	TO COMPLETE FILLING MUST BE FILLED AT TOP END.
(13) TOTAL VOLUME INSTALLED (GAL)	40 GAL.
(14) INSTALLATION PRESSURE (PSI)	70 PSI.

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-154
(2) TENDON END LOCATION	TOP - SHOP END

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

1

(3) DATE REMOVAL STARTED	10.1.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	59°
(5) TOTAL VOLUME REMOVED (GAL)	45 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.2.75
(8) DATE INSTALLED	10.2.75

FILLER INSTALLATION RECORDED BY RTK

1

(9) DATE INSTALLED	SEE FIELD END
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	
(13) TOTAL VOLUME INSTALLED (GAL)	
(14) INSTALLATION PRESSURE (PSI)	

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-154
(2) TENDON END LOCATION	BOTTOM - FIELD END

FILLER REMOVAL RECORDED BY F. B.

1

(3) DATE REMOVAL STARTED	10.1.75
(4) CONTAINMENT EXTERIOR CONCRETE	68°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	45 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.2.75
(8) DATE INSTALLED	10.2.75

FILLER INSTALLATION RECORDED BY R.T.K.

1

(9) DATE INSTALLED	10.17.75
(10) CONTAINMENT EXTERIOR CONCRETE	62°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	135°
(13) TOTAL VOLUME INSTALLED (GAL)	60 GAL
(14) INSTALLATION PRESSURE (PSI)	110 PSI

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-202
(2) TENDON END LOCATION	TOP - SHOP END

FILLER REMOVAL RECORDED BY H. S. GORAWSKI

1

(3) DATE REMOVAL STARTED	10.3.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(5) TOTAL VOLUME REMOVED (GAL)	55 GALS.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.3.75
(8) DATE INSTALLED	10.6.75

FILLER INSTALLATION RECORDED BY RTK

1

(9) DATE INSTALLED	SEE FIELD END.
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	
(13) TOTAL VOLUME INSTALLED (GAL)	
(14) INSTALLATION PRESSURE (PSI)	

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-202
(2) TENDON END LOCATION	BOTTOM - FIELD

FILLER REMOVAL RECORDED BY F. B.

1

(3) DATE REMOVAL STARTED	10.2.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	71°
(5) TOTAL VOLUME REMOVED (GAL)	55 GAL.
(6) SAMPLE TAKEN	YES (2)

SAMPLE MARKED #1 CONTAINS WATER (APPROX. 1 PT.)
" " #2 CONTAINS CASING FILLER.

FILLER CAP

(7) DATE REMOVED	10.3.75
(8) DATE INSTALLED	10.3.75

FILLER INSTALLATION RECORDED BY R.T.K.

1

(9) DATE INSTALLED	10-20-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	65°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	138°
(13) TOTAL VOLUME INSTALLED (GAL)	70 GAL.
(14) INSTALLATION PRESSURE (PSI)	110 PSI

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-280
(2) TENDON END LOCATION	TOP - SHOP END

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

1

(3) DATE REMOVAL STARTED	10.7.75
(4) CONTAINMENT EXTERIOR CONCRETE	69°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	50 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.7.75
(8) DATE INSTALLED	10.7.75

FILLER INSTALLATION RECORDED BY RTK

1

(9) DATE INSTALLED	SEE FIELD END
(10) CONTAINMENT EXTERIOR CONCRETE	
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	
(13) TOTAL VOLUME INSTALLED (GAL)	
(14) INSTALLATION PRESSURE (PSI)	

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	V-280
(2) TENDON END LOCATION	BOTTOM - FIELD

FILLER REMOVAL RECORDED BY F. B.

1

(3) DATE REMOVAL STARTED	10.3.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	78°
(5) TOTAL VOLUME REMOVED (GAL)	50 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.7.75
(8) DATE INSTALLED	10.7.75

FILLER INSTALLATION RECORDED BY RTK

1

(9) DATE INSTALLED	10-17-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	138°
(13) TOTAL VOLUME INSTALLED (GAL)	50 GAL
(14) INSTALLATION PRESSURE (PSI)	50 PSI

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D1-33
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY R.T. KRUPICKA

1

(3) DATE REMOVAL STARTED	10-23-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	76°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-23-75
(8) DATE INSTALLED	10-21-75

FILLER INSTALLATION RECORDED BY R.T. KRUPICKA

1

(9) DATE INSTALLED	10-27-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D1-33
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY R.T. KRUPICKA

△1

(3) DATE REMOVAL STARTED	10-23-75
(4) CONTAINMENT EXTERIOR CONCRETE	49°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-23-75
(8) DATE INSTALLED	10-27-75

FILLER INSTALLATION RECORDED BY R.T. KRUPICKA

△1

(9) DATE INSTALLED	10-27-75
(10) CONTAINMENT EXTERIOR CONCRETE	49°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	DI-51
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY R.T. KRUPICKA

1

(3) DATE REMOVAL STARTED	10-28-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	66°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-28-75
(8) DATE INSTALLED	10-29-75

FILLER INSTALLATION RECORDED BY R.T. KRUPICKA

1

(9) DATE INSTALLED	10-29-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	60°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	DI-51
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY R.T. KRUPICKA

△

(3) DATE REMOVAL STARTED	10-28-75
(4) CONTAINMENT EXTERIOR CONCRETE	54°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-28-75
(8) DATE INSTALLED	10-29-75

FILLER INSTALLATION RECORDED BY R.T. KRUPICKA

△

(9) DATE INSTALLED	10-29-75
(10) CONTAINMENT EXTERIOR CONCRETE	56°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED.

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D2-21
(2) TENDON END LOCATION	SHOP

FILLER REMOVAL RECORDED BY R.T. KRUPICKA

1

(3) DATE REMOVAL STARTED	10-22-75
(4) CONTAINMENT EXTERIOR CONCRETE	52°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-22-75
(8) DATE INSTALLED	10-22-75

FILLER INSTALLATION RECORDED BY RT KRUPICKA

1

(9) DATE INSTALLED	10-22-75
(10) CONTAINMENT EXTERIOR CONCRETE	68°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D2-21
(2) TENDON END LOCATION	FIELD

FILLER REMOVAL RECORDED BY R.T. KRUPICKA

1

(3) DATE REMOVAL STARTED	10-21-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-21-75
(8) DATE INSTALLED	10-22-75

FILLER INSTALLATION RECORDED BY R.T. KRUPICKA

1

(9) DATE INSTALLED	10-22-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	Da-49
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY RT KRUPICKA

1

(3) DATE REMOVAL STARTED	10-20-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-20-75
(8) DATE INSTALLED	10-21-75

FILLER INSTALLATION RECORDED BY RT KRUPICKA

1

(9) DATE INSTALLED	10-21-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D2-49
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY RT KRUPICKA

①

(3) DATE REMOVAL STARTED	10-20-75
(4) CONTAINMENT EXTERIOR CONCRETE	68°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-20-75
(8) DATE INSTALLED	10-21-75

FILLER INSTALLATION RECORDED BY RT KRUPICKA

①

(9) DATE INSTALLED	10-21-75
(10) CONTAINMENT EXTERIOR CONCRETE	68°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D3-40
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY R.T.K.

1

(3) DATE REMOVAL STARTED	10-16-75
(4) CONTAINMENT EXTERIOR CONCRETE	62°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-16-75
(8) DATE INSTALLED	10-17-75

FILLER INSTALLATION RECORDED BY R.T.K.

1

(9) DATE INSTALLED	10-17-75
(10) CONTAINMENT EXTERIOR CONCRETE	64°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D3-40
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY F.B.

1

(3) DATE REMOVAL STARTED	10-16-75
(4) CONTAINMENT EXTERIOR CONCRETE	69°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.0 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-16-75
(8) DATE INSTALLED	10-17-75

FILLER INSTALLATION RECORDED BY F.B.

1

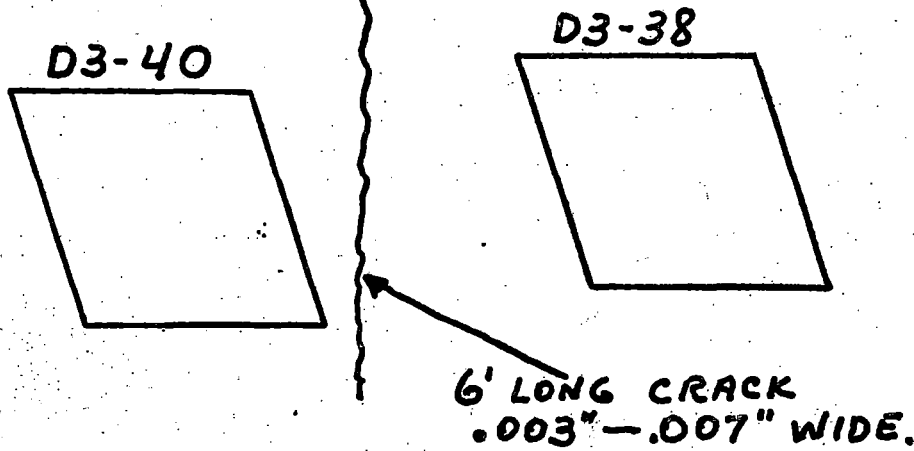
(9) DATE INSTALLED	10-17-75
(10) CONTAINMENT EXTERIOR CONCRETE	69°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.0 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

D3-40 FIELD END.

10.16.75
DATE

TOP OF DOME RING



BY H.S. GORAWSKI

CHK'D

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D3-49
(2) TENDON END LOCATION	SHOP END (BETW. A-F)

FILLER REMOVAL RECORDED BY F.B.

1

(3) DATE REMOVAL STARTED	10.14.75
(4) CONTAINMENT EXTERIOR CONCRETE	75°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.14.75
(8) DATE INSTALLED	10.16.75

FILLER INSTALLATION RECORDED BY R.T.K.

1

(9) DATE INSTALLED	10.16.75
(10) CONTAINMENT EXTERIOR CONCRETE	60°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	58°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	58°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND PACKED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	D3-49
(2) TENDON END LOCATION	FIELD (BETWEEN B-C)

FILLER REMOVAL RECORDED BY H. S. GORAWSKI

1

(3) DATE REMOVAL STARTED	10.14.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	80°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10.14.75
(8) DATE INSTALLED	10.15.75

FILLER INSTALLATION RECORDED BY H. S. GORAWSKI

1

(9) DATE INSTALLED	10.15.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	69°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	2.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	N/A

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	49EA
(2) TENDON END LOCATION	SHOP END (E)

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

(3) DATE REMOVAL STARTED	12.2.75
(4) CONTAINMENT EXTERIOR CONCRETE	32°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	12.2.75
(8) DATE INSTALLED	12.3.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

(9) DATE INSTALLED	12.3.75
(10) CONTAINMENT EXTERIOR CONCRETE	34°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	150°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	150°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	49 EA
(2) TENDON END LOCATION	FIELD (A)

FILLER REMOVAL RECORDED BY D. WAITKUS

(3) DATE REMOVAL STARTED	12.2.75
(4) CONTAINMENT EXTERIOR CONCRETE	52°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	12.2.75
(8) DATE INSTALLED	12.3.75

FILLER INSTALLATION RECORDED BY L. G.

(9) DATE INSTALLED	12.3.75
(10) CONTAINMENT EXTERIOR CONCRETE	55°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	160°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	160°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

TENDON

(1) TENDON IDENTIFICATION		59 BD
(2) TENDON END LOCATION		SHOP

FILLER REMOVAL RECORDED BY Woody

1

(3) DATE REMOVAL STARTED		11.17.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE		50°
(5) TOTAL VOLUME REMOVED (GAL)		1 GAL.
(6) SAMPLE TAKEN		YES (1)

FILLER CAP

(7) DATE REMOVED		11.17.75
(8) DATE INSTALLED		11.18.75

FILLER INSTALLATION RECORDED BY Woody

1

(9) DATE INSTALLED		11.18.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE		60°
(11) FILLER TEMPERATURE AT PUMP (°F)		145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)		145°
(13) TOTAL VOLUME INSTALLED (GAL)		1 GAL.
(14) INSTALLATION PRESSURE (PSI)		HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

TENDON

(1) TENDON IDENTIFICATION	59 BD
(2) TENDON END LOCATION	FIELD

FILLER REMOVAL RECORDED BY H. S. GORAWSKI

1

(3) DATE REMOVAL STARTED	11.17.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.17.75
(8) DATE INSTALLED	11.18.75

FILLER INSTALLATION RECORDED BY H. S. GORAWSKI

1

(9) DATE INSTALLED	11.18.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	71°
(11) FILLER TEMPERATURE AT PUMP (°F)	153°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	153°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	63 BD
(2) TENDON END LOCATION	SHOP

FILLER REMOVAL RECORDED BY L. G.

1

(3) DATE REMOVAL STARTED	11. 18. 75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	56°
(5) TOTAL VOLUME REMOVED (GAL)	2 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11. 18. 75
(8) DATE INSTALLED	11. 18. 75

FILLER INSTALLATION RECORDED BY L. G.

1

(9) DATE INSTALLED	11. 18. 75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	73°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	2 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	63 BD
(2) TENDON END LOCATION	FIELD

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

△

(3) DATE REMOVAL STARTED	11.18.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	73°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.18.75
(8) DATE INSTALLED	11.18.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

△

(9) DATE INSTALLED	11.18.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	76°
(11) FILLER TEMPERATURE AT PUMP (°F)	153°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	153°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	80 BD
(2) TENDON END LOCATION	SHOP

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

(3) DATE REMOVAL STARTED	11.19.75
(4) CONTAINMENT EXTERIOR CONCRETE	58°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	2 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.19.75
(8) DATE INSTALLED	11.19.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

(9) DATE INSTALLED	11.19.75
(10) CONTAINMENT EXTERIOR CONCRETE	60°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	2 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

TENDON

(1) TENDON IDENTIFICATION	80 BD
(2) TENDON END LOCATION	FIELD

FILLER REMOVAL RECORDED BY F. COCHRANE

△

(3) DATE REMOVAL STARTED	11.19.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	64°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.19.75
(8) DATE INSTALLED	11.19.75

FILLER INSTALLATION RECORDED BY F. COCHRANE

△

(9) DATE INSTALLED	11.19.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	73°
(11) FILLER TEMPERATURE AT PUMP (°F)	220°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	220°
(13) TOTAL VOLUME INSTALLED (GAL)	2 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	66 BF
(2) TENDON END LOCATION	SHOP

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

(3) DATE REMOVAL STARTED	11.24.75
(4) CONTAINMENT EXTERIOR CONCRETE	44°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.24.75
(8) DATE INSTALLED	11.25.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

(9) DATE INSTALLED	11.25.75
(10) CONTAINMENT EXTERIOR CONCRETE	38°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	155°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	155°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	66 BF
(2) TENDON END LOCATION	FIELD

FILLER REMOVAL RECORDED BY L. G.

(3) DATE REMOVAL STARTED	11.24.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	58°
(5) TOTAL VOLUME REMOVED (GAL)	1 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.24.75
(8) DATE INSTALLED	11.25.75

FILLER INSTALLATION RECORDED BY L. G.

(9) DATE INSTALLED	11.25.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	53°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	71 BF
(2) TENDON END LOCATION	SHOP END (F)

FILLER REMOVAL RECORDED BY H. S. GORAWSKI

(3) DATE REMOVAL STARTED	11.25.75
(4) CONTAINMENT EXTERIOR CONCRETE	42°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.25.75
(8) DATE INSTALLED	11.26.75

FILLER INSTALLATION RECORDED BY H. S. GORAWSKI

(9) DATE INSTALLED	11.26.75
(10) CONTAINMENT EXTERIOR CONCRETE	34°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	140°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	140°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

FALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	71 BF
(2) TENDON END LOCATION	FIELD (B)

FILLER REMOVAL RECORDED BY L. G.

1

(3) DATE REMOVAL STARTED	11.25.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	48°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.25.75
(8) DATE INSTALLED	11.26.75

FILLER INSTALLATION RECORDED BY L. G.

1

(9) DATE INSTALLED	11.26.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	43°
(11) FILLER TEMPERATURE AT PUMP (°F)	210°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	210°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	79 BF
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY H.S. GORAWSKI

(3) DATE REMOVAL STARTED	11.26.75
(4) CONTAINMENT EXTERIOR CONCRETE	32°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.26.75
(8) DATE INSTALLED	12.1.75

FILLER INSTALLATION RECORDED BY H.S. GORAWSKI

(9) DATE INSTALLED	12.1.75
(10) CONTAINMENT EXTERIOR CONCRETE	22°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	79 BF
(2) TENDON END LOCATION	FIELD

FILLER REMOVAL RECORDED BY L. G.

(3) DATE REMOVAL STARTED	11.26.75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	40°
(5) TOTAL VOLUME REMOVED (GAL)	1 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11.26.75
(8) DATE INSTALLED	12.1.75

FILLER INSTALLATION RECORDED BY L. G.

(9) DATE INSTALLED	12.1.75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	40°
(11) FILLER TEMPERATURE AT PUMP (°F)	160°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	160°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	56DF
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY RTK

①

(3) DATE REMOVAL STARTED	OCT 29-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-29-75
(8) DATE INSTALLED	10-31-75

FILLER INSTALLATION RECORDED BY RTK

①

(9) DATE INSTALLED	10-31-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	56 DF
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY RTK

△

(3) DATE REMOVAL STARTED	10-29-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	51°
(5) TOTAL VOLUME REMOVED (GAL)	3 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	10-29-75
(8) DATE INSTALLED	10-31-75

FILLER INSTALLATION RECORDED BY RTK

△

(9) DATE INSTALLED	10-31-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	51°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	3 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	68DF
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY RT KRUPICKA

(3) DATE REMOVAL STARTED	11-4-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	72°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL.
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11-4-75
(8) DATE INSTALLED	11-4-75

FILLER INSTALLATION RECORDED BY H. GORAWSKI

(9) DATE INSTALLED	11-4-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	72°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL.
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	68DF
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY L. GRANDY

1

(3) DATE REMOVAL STARTED	11-4-75
(4) CONTAINMENT EXTERIOR CONCRETE	62°
TEMPERATURE NEAR TENDON ANCHORAGE	
(5) TOTAL VOLUME REMOVED (GAL)	2 GAL
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11-4-75
(8) DATE INSTALLED	11-4-75

FILLER INSTALLATION RECORDED BY RT KRUPICKA

1

(9) DATE INSTALLED	11-4-75
(10) CONTAINMENT EXTERIOR CONCRETE	62°
TEMPERATURE NEAR TENDON ANCHORAGE	
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	2 GAL
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	76DF
(2) TENDON END LOCATION	SHOP END

FILLER REMOVAL RECORDED BY H. S. GORAWSKI



(3) DATE REMOVAL STARTED	11-5-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11-5-75
(8) DATE INSTALLED	11-5-75

FILLER INSTALLATION RECORDED BY H. S. GORAWSKI



(9) DATE INSTALLED	11-5-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	81°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	2 GAL
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON

(1) TENDON IDENTIFICATION	76DF
(2) TENDON END LOCATION	FIELD END

FILLER REMOVAL RECORDED BY RT KRUPICKA

1

(3) DATE REMOVAL STARTED	11-5-75
(4) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	61°
(5) TOTAL VOLUME REMOVED (GAL)	1.5 GAL
(6) SAMPLE TAKEN	YES (1)

FILLER CAP

(7) DATE REMOVED	11-5-75
(8) DATE INSTALLED	11-5-75

FILLER INSTALLATION RECORDED BY RT KRUPICKA

1

(9) DATE INSTALLED	11-5-75
(10) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	61°
(11) FILLER TEMPERATURE AT PUMP (°F)	145°
(12) FILLER TEMPERATURE AT OUTLET CAP (°F)	145°
(13) TOTAL VOLUME INSTALLED (GAL)	1.5 GAL
(14) INSTALLATION PRESSURE (PSI)	HAND POURED

FIGURE C-1 SHEATHING FILLER REMOVAL AND INSTALLATION

APPENDIX C

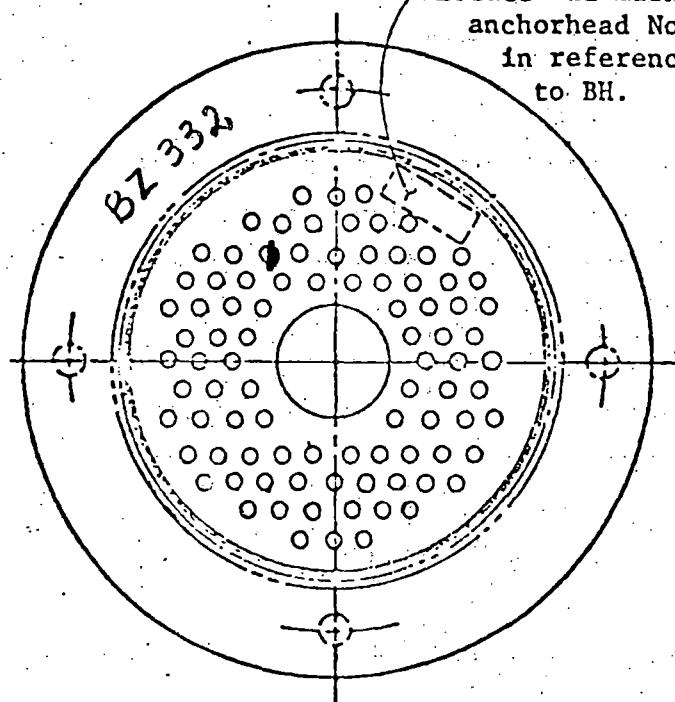
Tendon End Anchor Data.

FIVE YEAR TENDON SURVEILLANCE

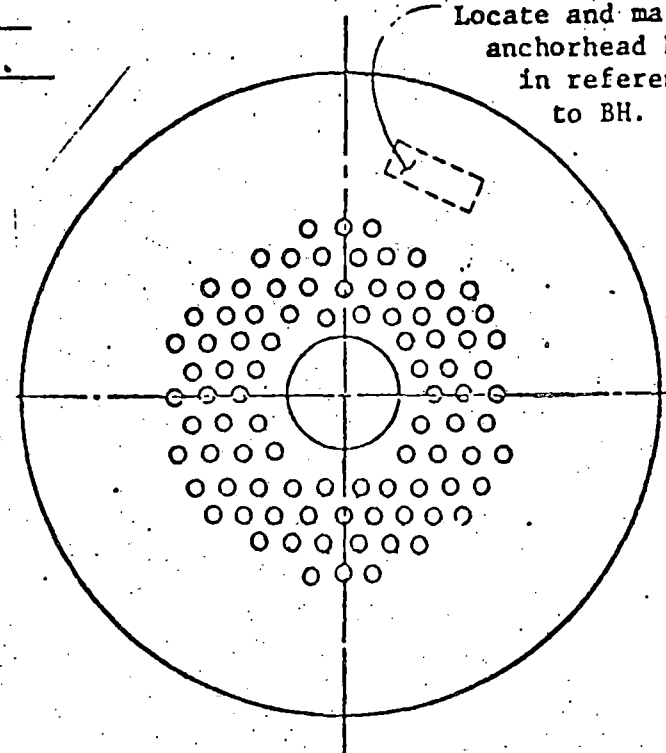
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-36
Date: 9.29.75 By: H.S.G.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.


FIELD END

Locate and mark
anchorhead No.
in referen
to BH.


Shop End	Anchor Location	Field End
✓		
Filler Coverage		
GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
*GOOD	Bearing Plate	
NONE	No. Off-Size BH	
1	No. of Split BH	

Corrosion Level		
1	Button Heads	
2	Anchor Head	
2	Bushing	
2	Shims	
* 2	Bearing Plate	

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

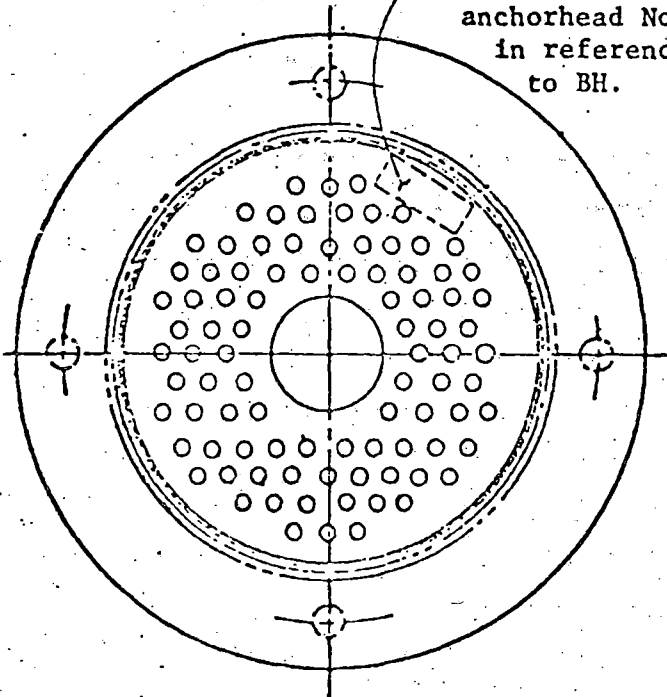
FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-36Date: 9.26.75 By: F.B.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

	Anchor Location	
--	-----------------	--

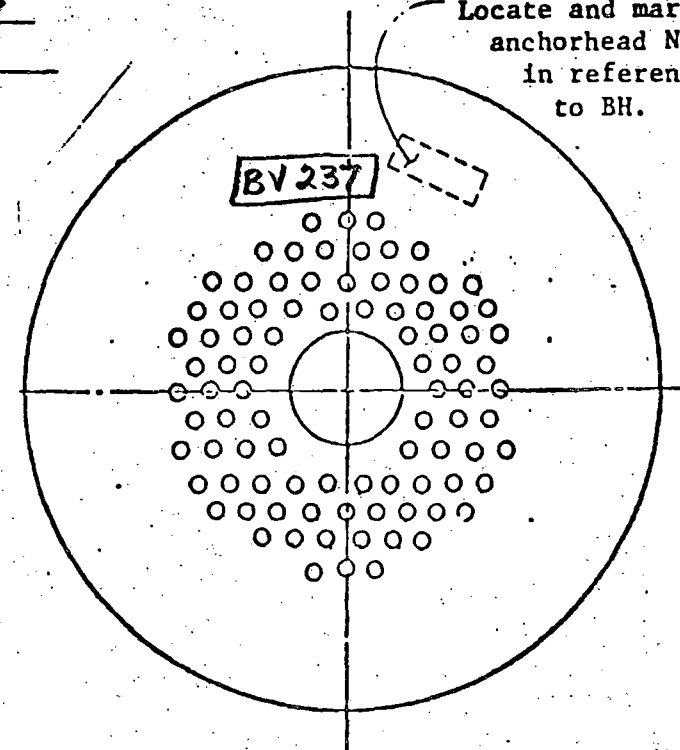
Filler Coverage		
	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	N/A
	Shims	GOOD
	Bearing Plate	GOOD *
	No. Off-Size BH	NONE
	No. of Split BH	NONE

Corrosion Level		
	Button Heads	2
	Anchor Head	2
	Bushing	N/A
	Shims	1
	Bearing Plate	3 *

* SURFACE COVERED BY
GREASE CAP ONLY.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE.

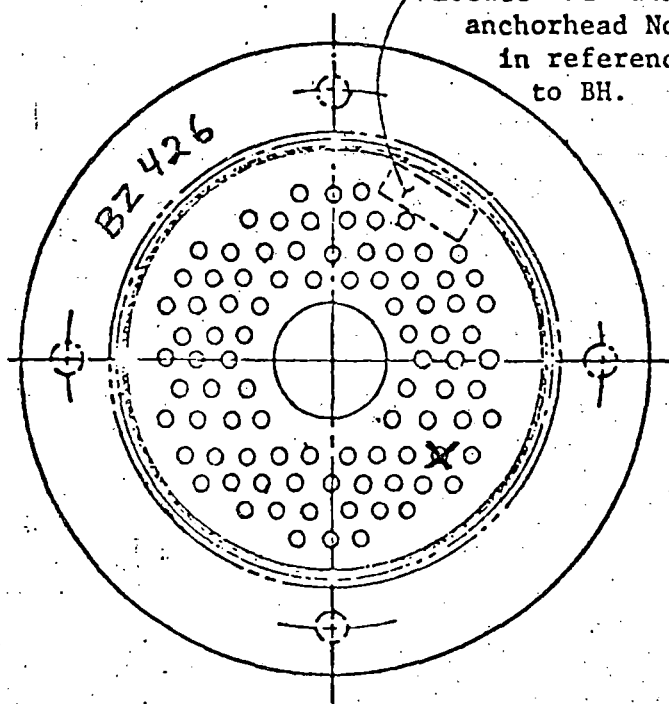
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-86

Date: 10.1.75 By: H.S.G.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

Shop End	Field End
✓	Anchor Location

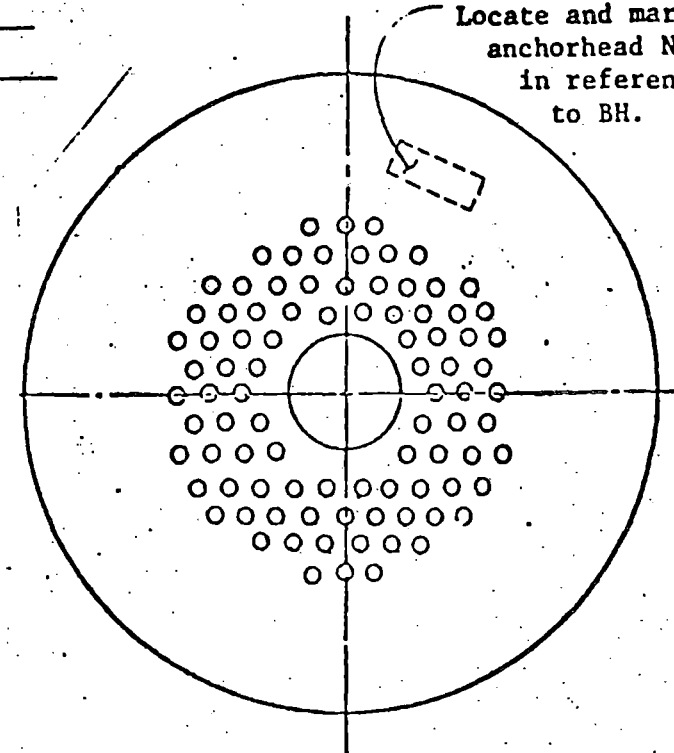
Filler Coverage	
GOOD	Cap
GOOD	Buttonheads
GOOD	Anchor Head
GOOD	Bushing
GOOD	Shims
* GOOD	Bearing Plate
NONE	No. Off-Size BH
NONE	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
* 2	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

FIELD END

Locate and mark
anchorhead No
in reference
to BH.



LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

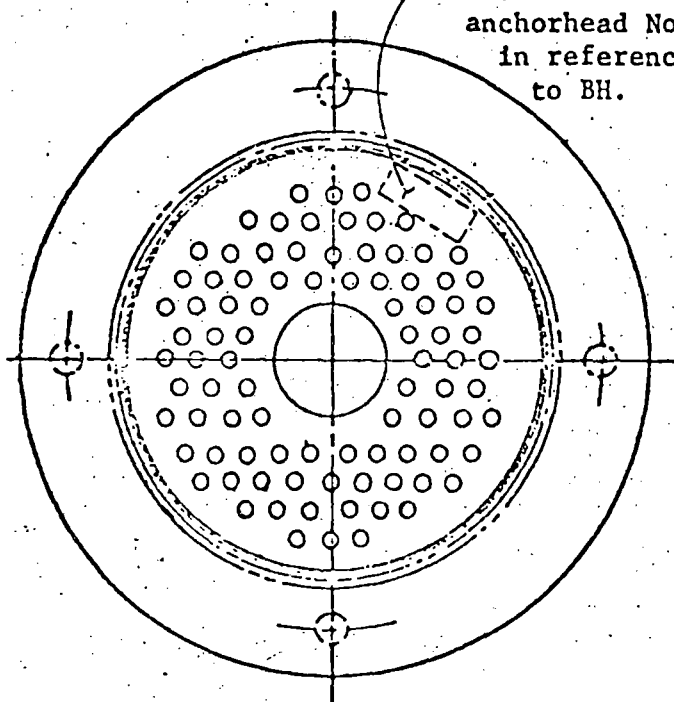
FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-86Date: 10.1.75 By: F.B.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.

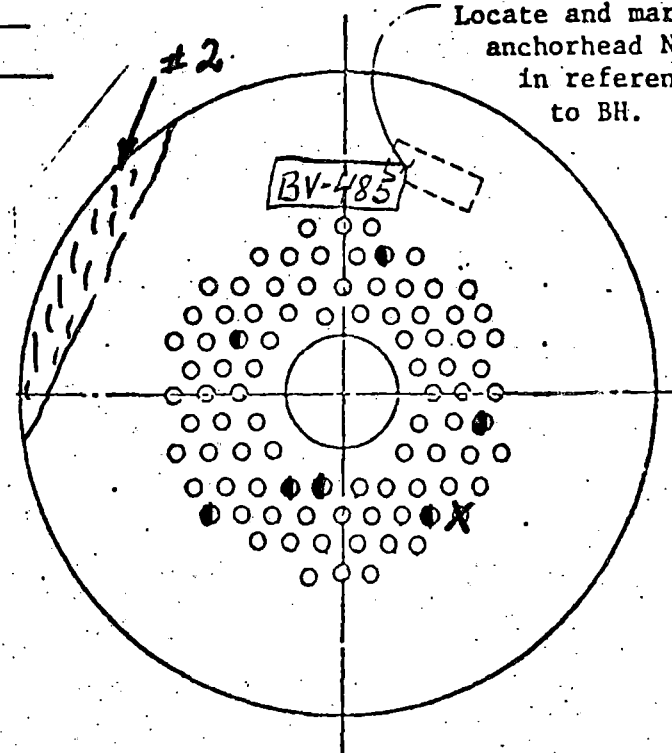
Shop End	Field End
	Anchor Location

Filler Coverage	
	Cap
	Buttonheads
	Anchor Head
	Bushing
	Shims
	Bearing Plate
	No. Off-Size BH
	No. of Split BH

Corrosion Level	
	Button Heads
	Anchor Head
	Bushing
	Shims
	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003''$
- #4 $.003'' < \text{pitting} \leq .006''$
- #5 $.006'' < \text{pitting} \leq .010''$

NOTE: SLUDGE OR OTHER
FOREIGN MATTER
FOUND ON BUTTONHEADS
AND GREASE.
3 SAMPLES TAKEN.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

NOTE: WATER DROPS FORMED ON
WIRES AFTER DETENSIONING.

FIVE YEAR TENDON SURVEILLANCE

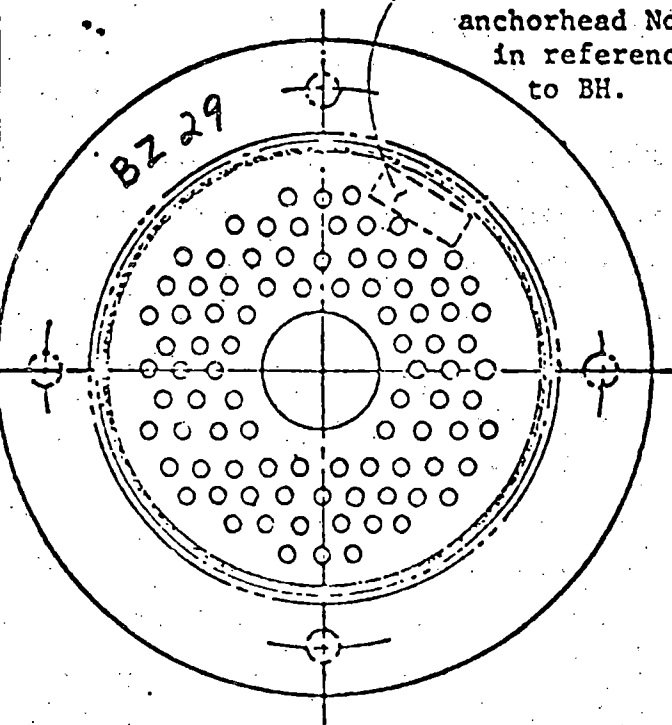
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-154

Date: 10.2.75 By: H.S.G.

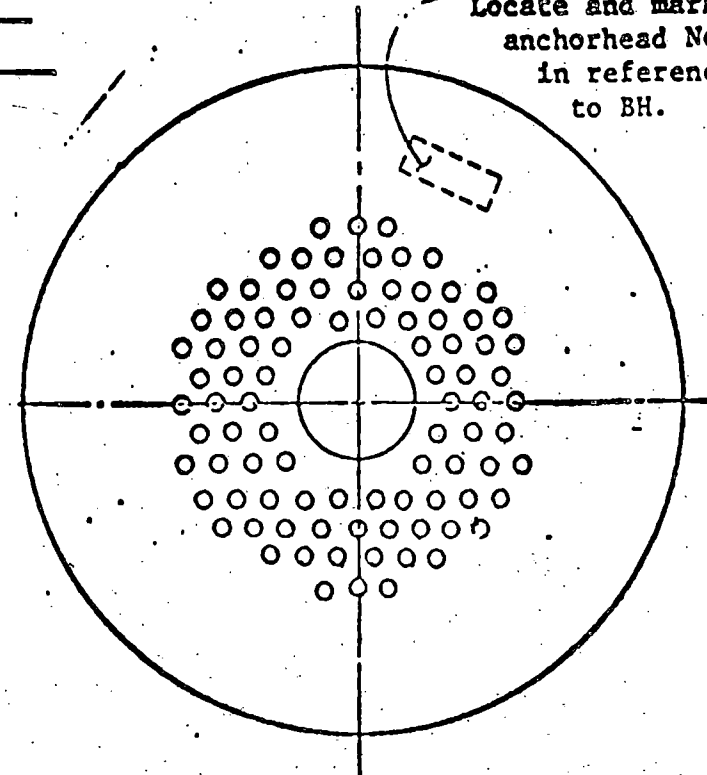
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No
in reference
to BH.



Shop End	Field End
✓	Anchor Location
Filler Coverage	
GOOD	Cap
GOOD	Buttonheads
GOOD	Anchor Head
GOOD	Bushing
GOOD	Shims
* GOOD	Bearing Plate
NONE	No. Off-Size BH
NONE	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
2	Bushing
1	Shims
* 2	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

- LEGEND FOR WIRE AND BUTTONHEADS
- ⊙ Wire removed previously.
 - ⊘ Discontinuous wire removed this surveillance.
 - ⊗ Wire removed this surveillance for inspection.
 - Off-size buttonhead.
 - ◐ Buttonhead with split.
 - L) Large buttonhead.
 - S) Small buttonhead.

- LEGEND FOR CORROSION LEVEL
- #1 No visible oxidation
 - #2 Visible oxidation, no pitting
 - #3 $0 < \text{pitting} \leq .003"$
 - #4 $.003" < \text{pitting} \leq .006"$
 - #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

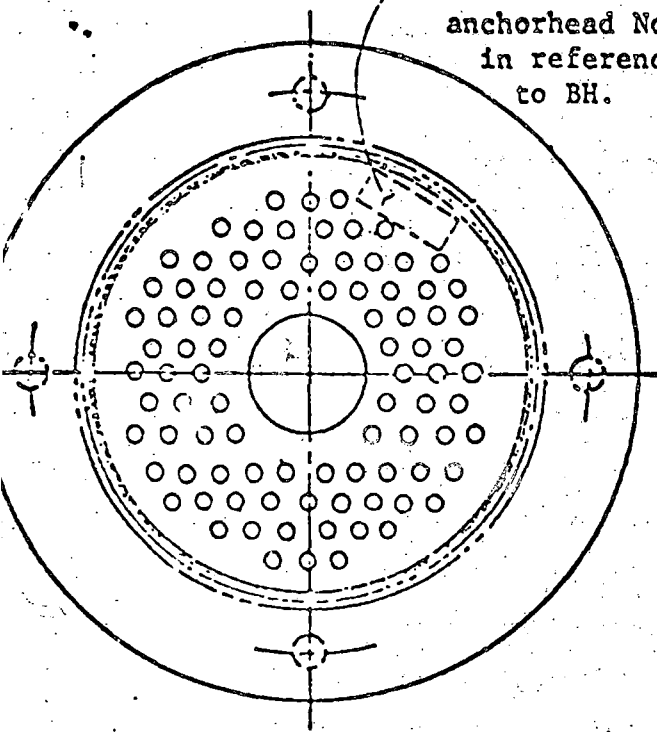
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-154

Date: 10.2.75 By: F.B.

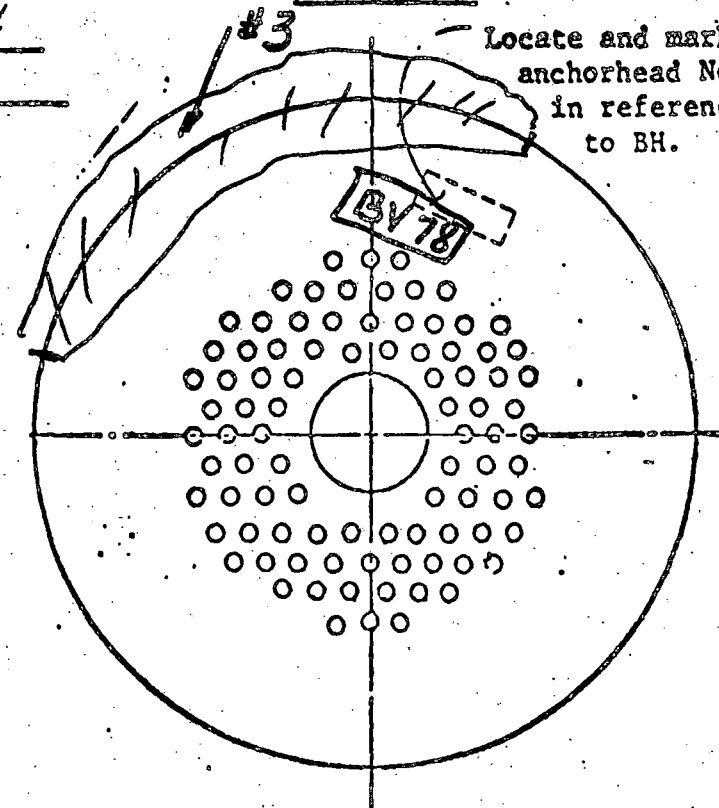
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
	Anchor Location
	✓
	Filler Coverage
	Cap
	GOOD
	Buttonheads
	GOOD
	Anchor Head
	GOOD
	Bushing
	N/A
	Shims
	GOOD
	Bearing Plate
	GOOD *
	No. Off-Size BH
	NONE
	No. of Split BH
	NONE

Corrosion Level
Button Heads
1
Anchor Head
3
Bushing
N/A
Shims
2
Bearing Plate
2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- Buttonhead with split.
- Large buttonhead.
- Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

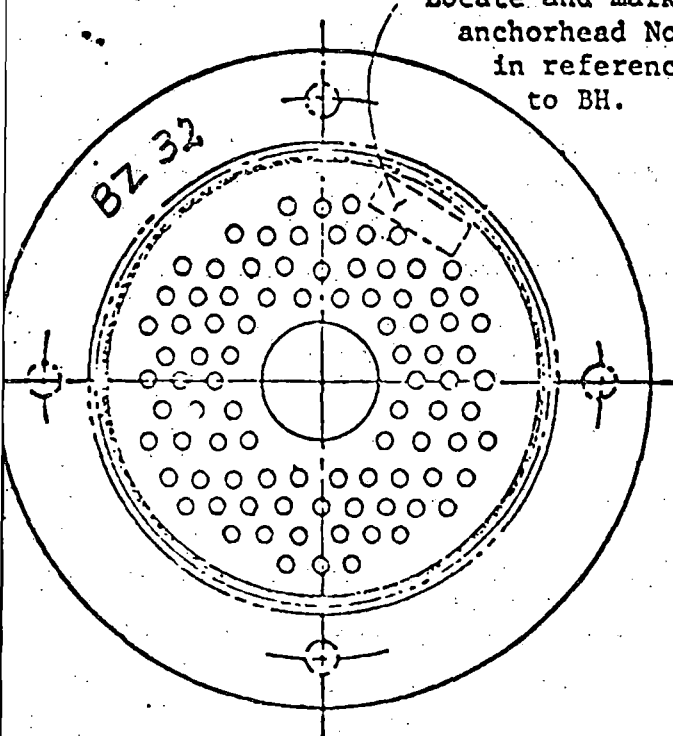
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-202

Date: 10.3.75 By: H.S.G.

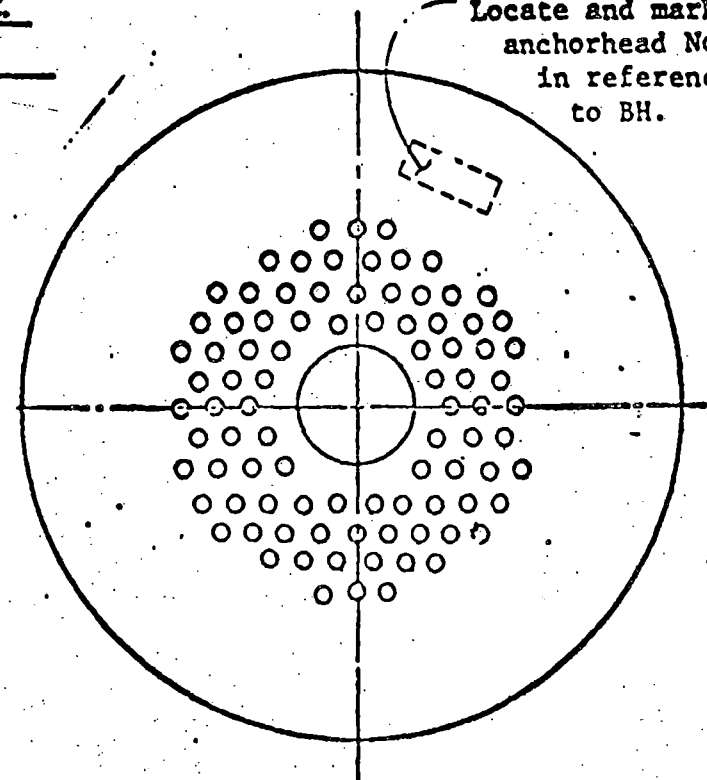
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No
in reference
to BH.



Shop End	Field End
<input checked="" type="checkbox"/>	Anchor Location
Filler Coverage	
GOOD	Cap
GOOD	Buttonheads
GOOD	Anchor Head
GOOD	Bushing
GOOD	Shims
* GOOD	Bearing Plate
NONE	No. Off-Size BH
NONE	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
* 2	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- Discontinuous wire removed this surveillance.
- ✗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- Buttonhead with split.
- L) Large buttonhead.
- S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

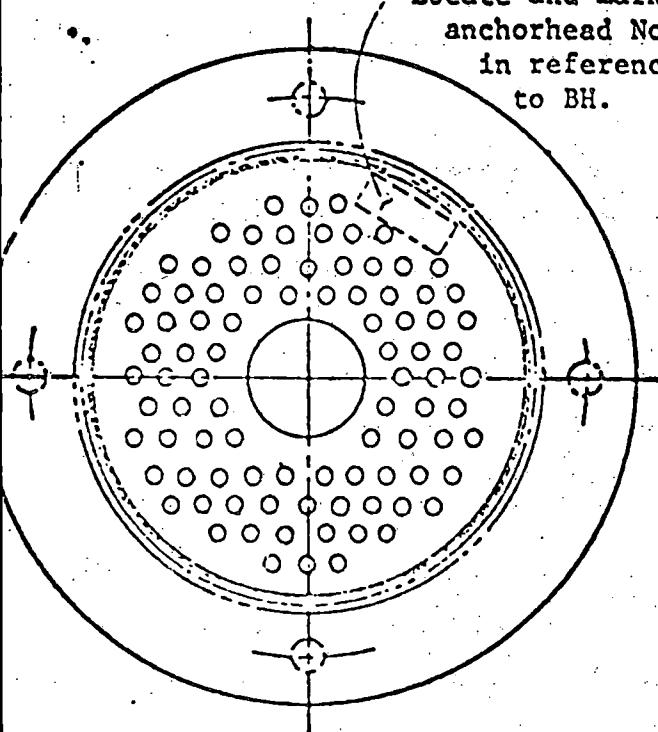
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-202

Date: 10.3.75 By: F.S.

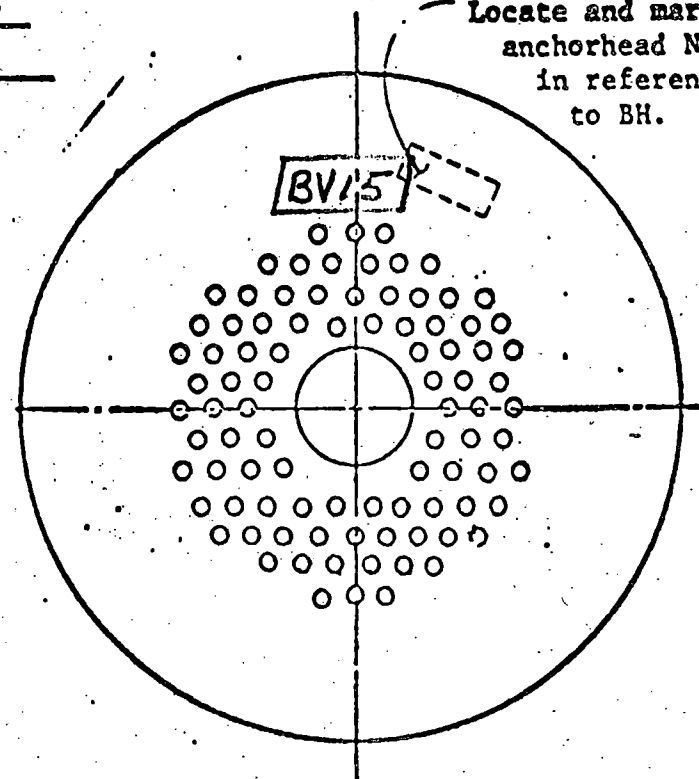
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
	Anchor Location

	Anchor Location	✓
	Filler Coverage	
	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	GOOD
	Shims	GOOD
	Bearing Plate	GOOD *
	No. Off-Size BH	NONE
	No. of Split BH	NONE

	Corrosion Level	
	Button Heads	1
	Anchor Head	1
	Bushing	N/A
	Shims	1
	Bearing Plate	1 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊖ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊖ Buttonhead with split.
- Large buttonhead.
- Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

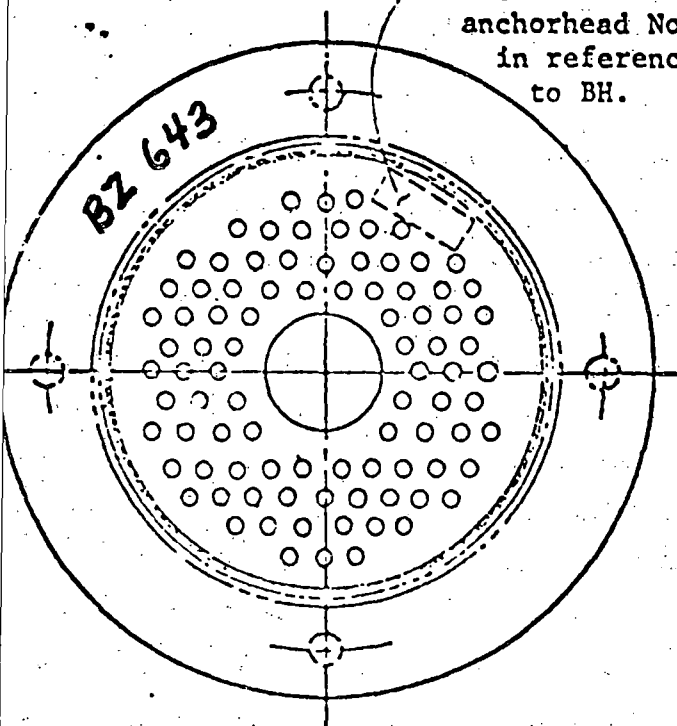
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-280

Date: 10.7.75 By: H.S.G.

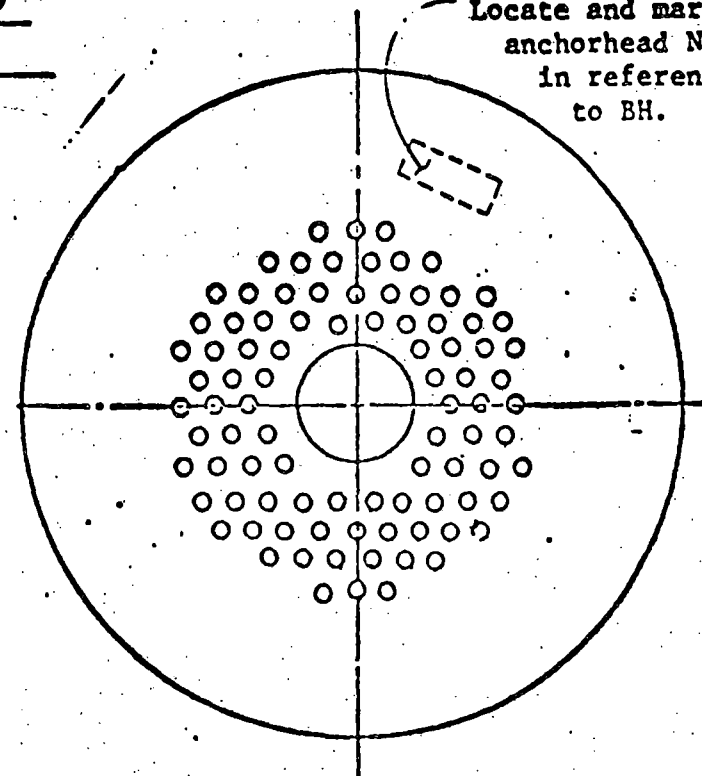
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Filler Coverage

GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
* GOOD	Bearing Plate	
NONE	No. Off-Size BH	
NONE	No. of Split BH	

Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
* 2	Bearing Plate	

*** SURFACE COVERED BY
GREASE CAP ONLY.**

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- Discontinuous wire removed this surveillance.
- ✗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- Buttonhead with split.
- L) Large buttonhead.
- S) Small buttonhead.

NOTE: TRACE OF MOISTURE ON WIRES BELOW THE ANCHOR HEAD.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

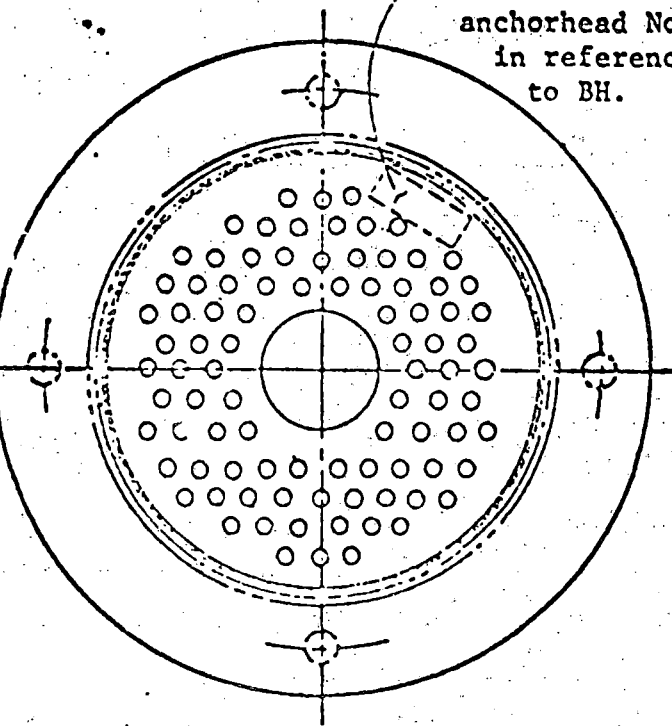
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification V-280

Date: 10.7.75 By: F.B.

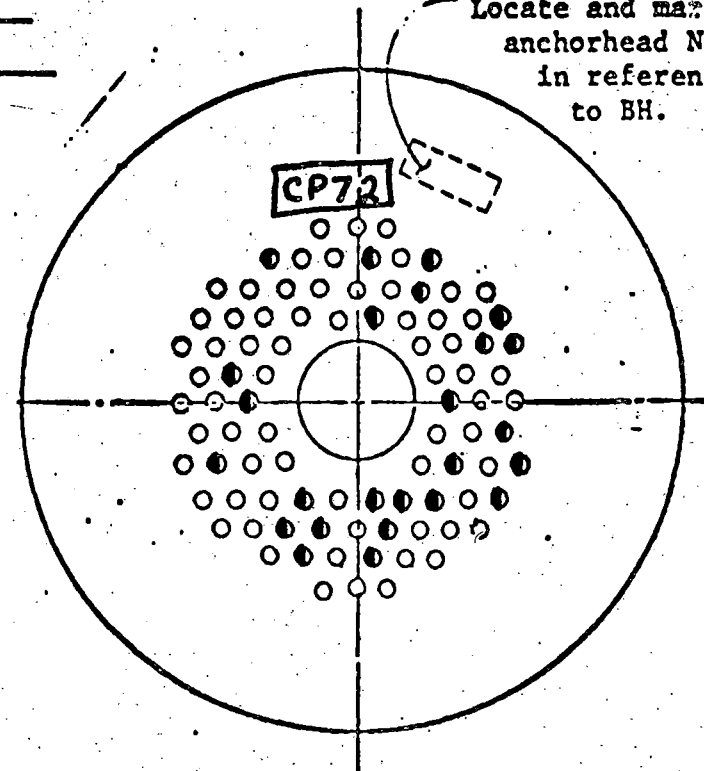
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
	Anchor Location
	✓
	Filler Coverage
	Cap
	GOOD
	Buttonheads
	GOOD
	Anchor Head
	GOOD
	Bushing
	N/A
	Shims
	GOOD
	Bearing Plate
	GOOD *
	No. Off-Size BH
	25-SM.
	No. of Split BH
	NONE

Corrosion Level
Button Heads
1
Anchor Head
1
Bushing
N/A
Shims
1
Bearing Plate
1 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- Buttonhead with split.
- Large buttonhead.
- Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

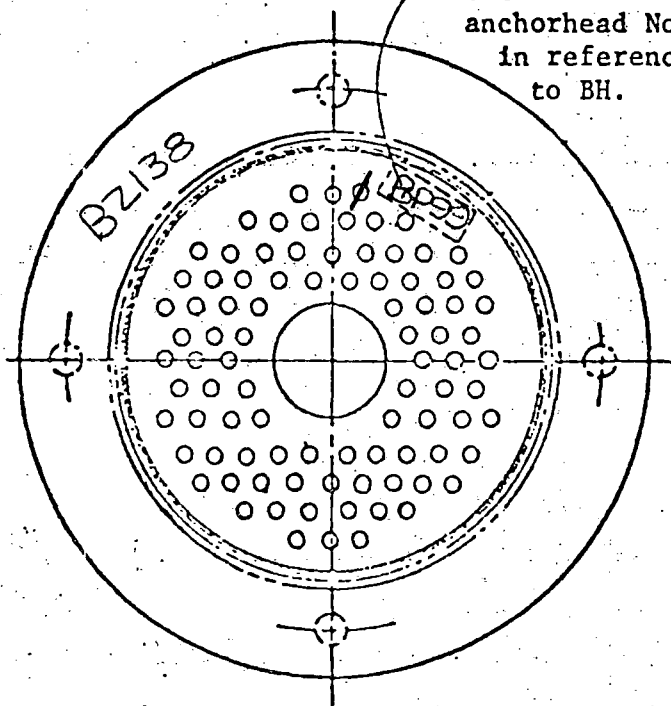
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D1-33

Date: 10-23-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

Shop End

Field End

✓	Anchor Location	
---	-----------------	--

Filler Coverage

GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
NONE	No. of Split BH	

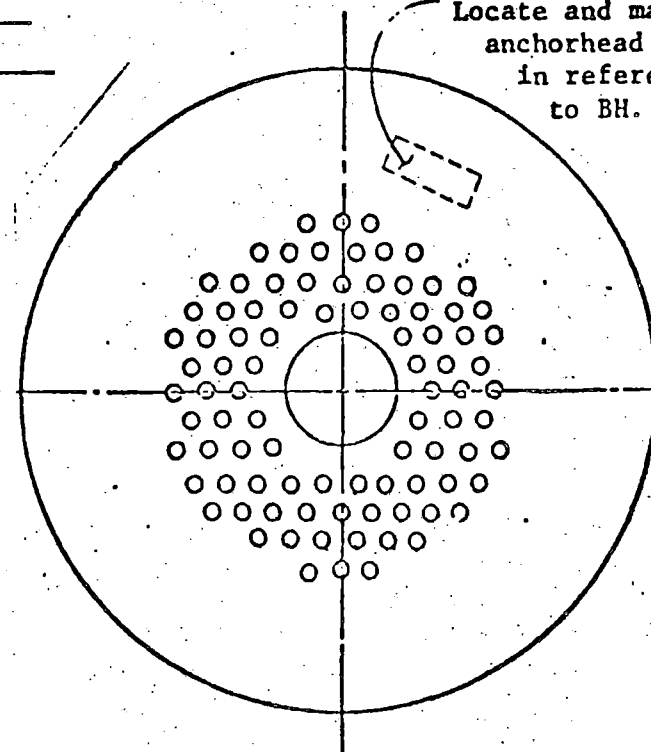
Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1 *	Bearing Plate	

* Surface covered
by grease cap only.

FIELD END

Locate and mark
anchorhead
in reference
to BH.



LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

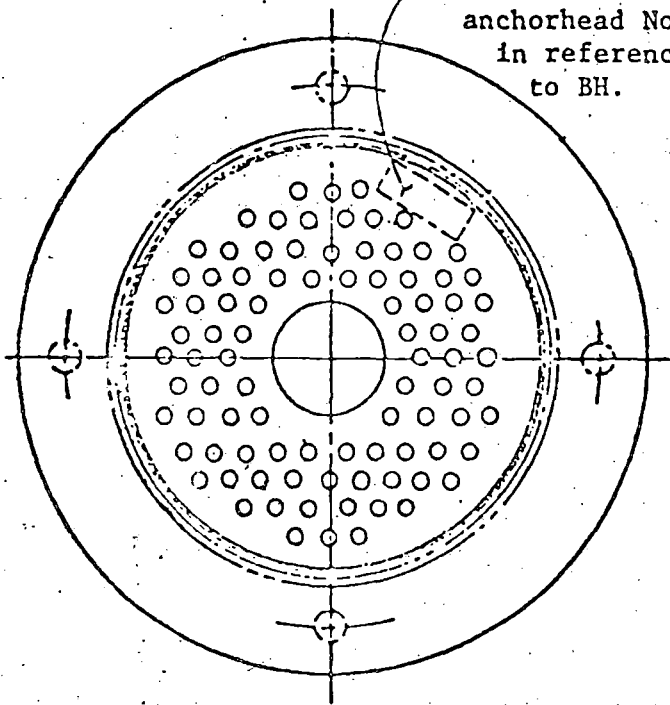
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D1-33-F

Date: 10-23-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

Anchor Location	✓
-----------------	---

Filler Coverage

Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	N/A
Shims	GOOD
Bearing Plate	GOOD*
No. Off-Size BH	NONE
No. of Split BH	4

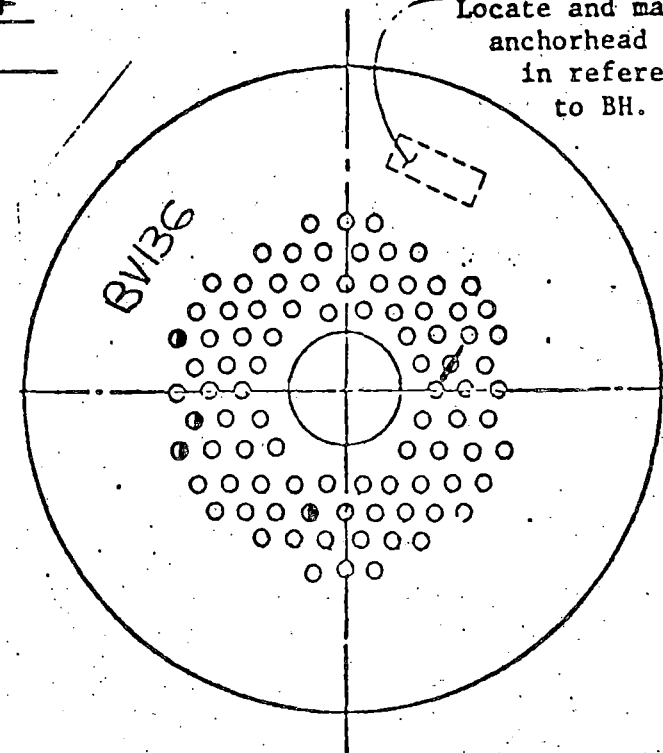
Corrosion Level

Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	1 *

* Surface covered by
grease cap only.

FIELD END

Locate and mar
anchorhead N
in referen
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE.

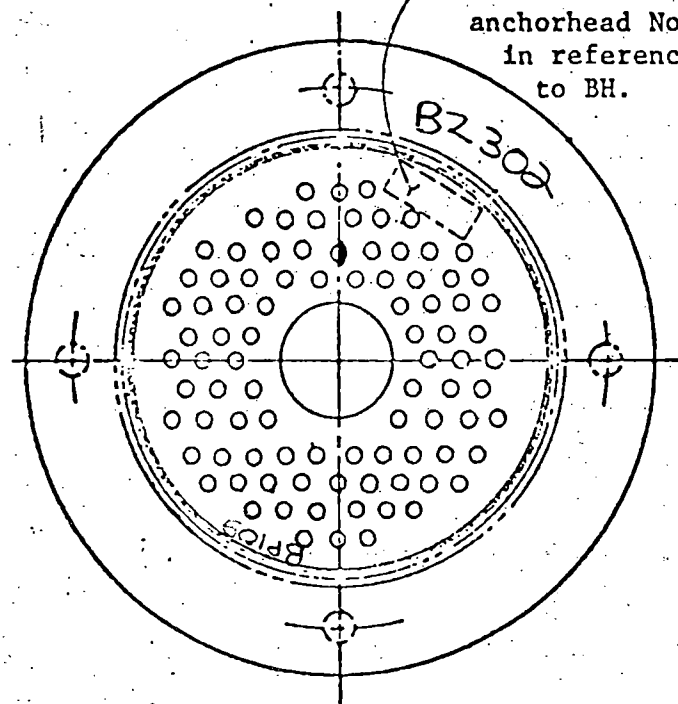
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D1-51

Date: 10-28-15 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End

Field End

<input checked="" type="checkbox"/>	Anchor Location	
-------------------------------------	-----------------	--

Filler Coverage

GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
1	No. of Split BH	

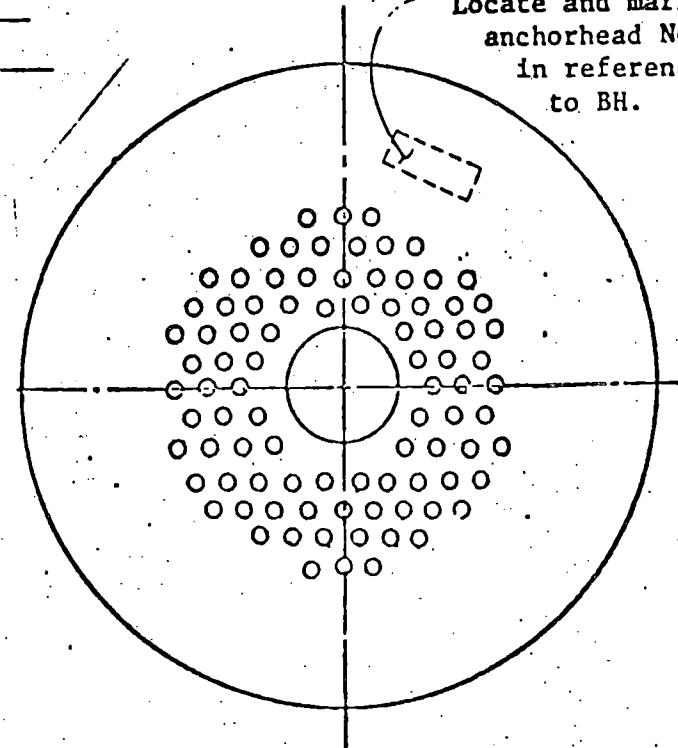
Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1*	Bearing Plate	

* Surface covered by
grease cap only.

FIELD END

Locate and mark
anchorhead No
in referenc
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

PALM BEACHES PLANT

FIVE YEAR TENDON SURVEILLANCE

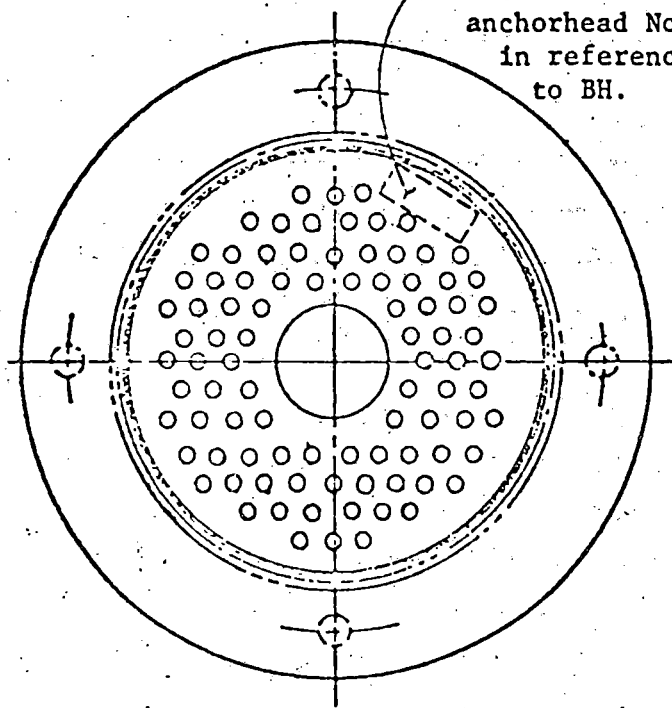
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D1-51

Date: 10-28-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End

Field End

Anchor Location	
	✓

Filler Coverage

Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	N/A
Shims	GOOD
Bearing Plate	GOOD*
No. Off-Size BH	NONE
No. of Split BH	NONE

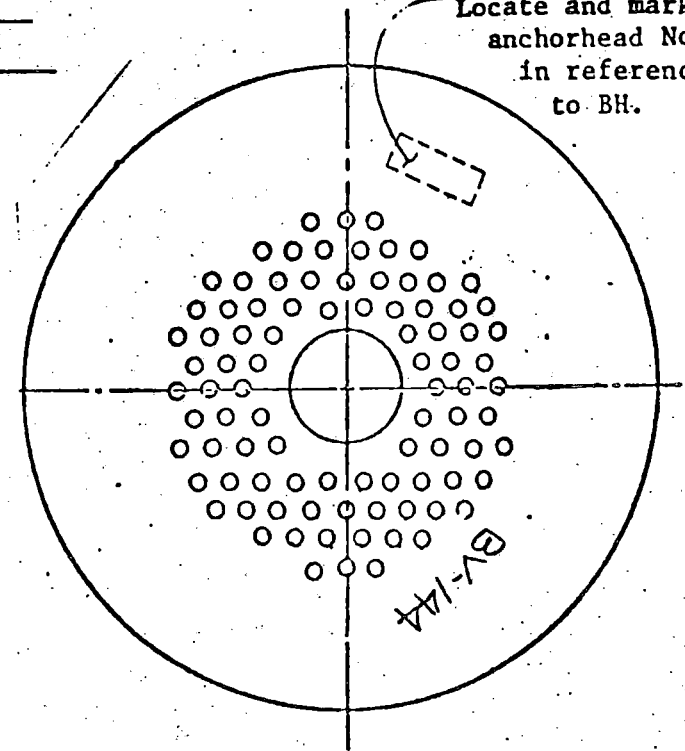
Corrosion Level

Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	1 *

* Surface covered by
grease cap only.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

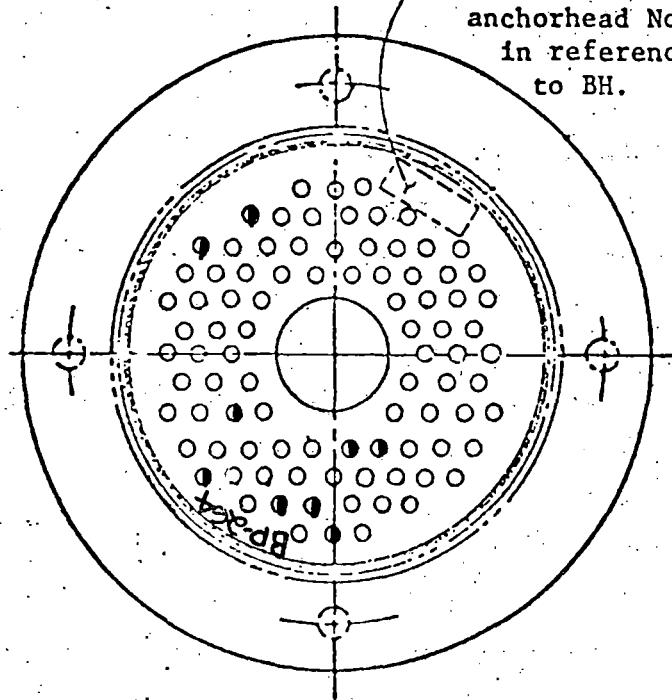
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D2-21

Date: 10-22-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End

Field End

✓	Anchor Location	
---	-----------------	--

Filler Coverage

GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
9	No. of Split BH	

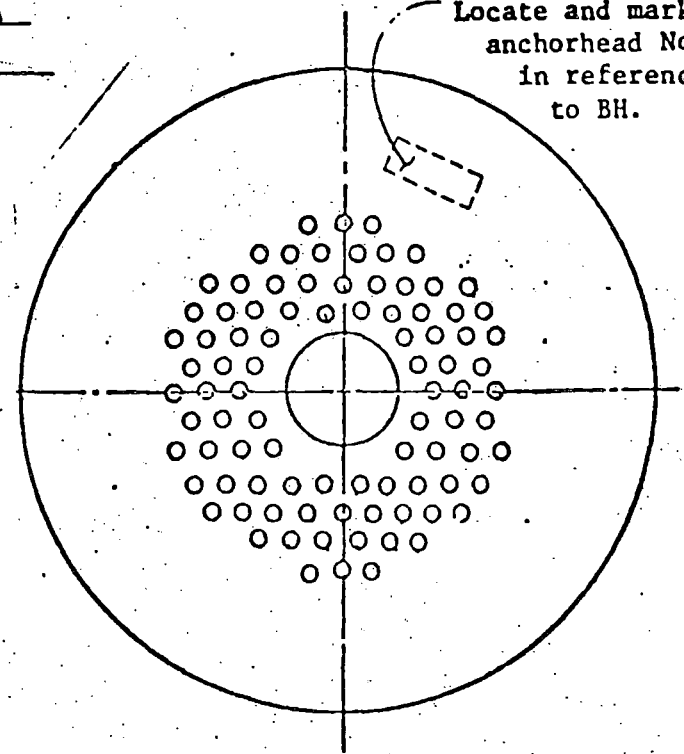
Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1*	Bearing Plate	

* Surface covered by
grease cap only.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ① Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

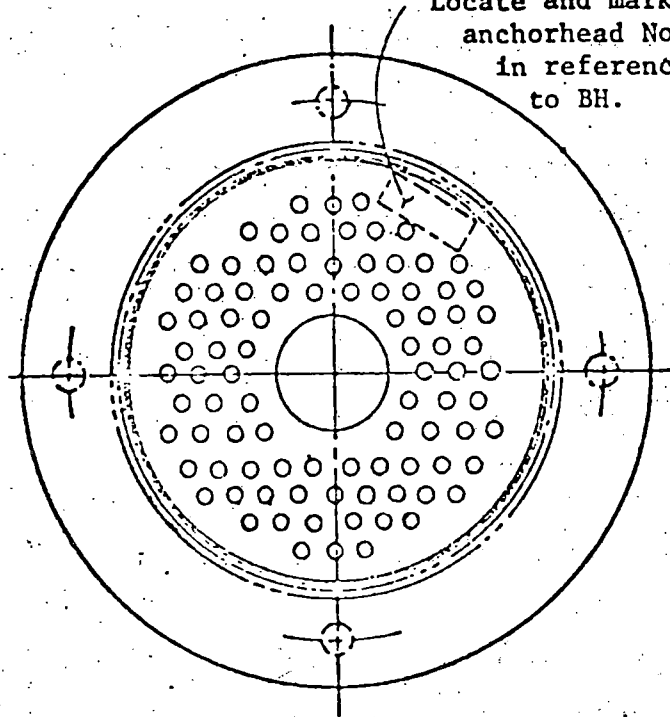
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D2-21

Date: 10-22-75 By: RTK

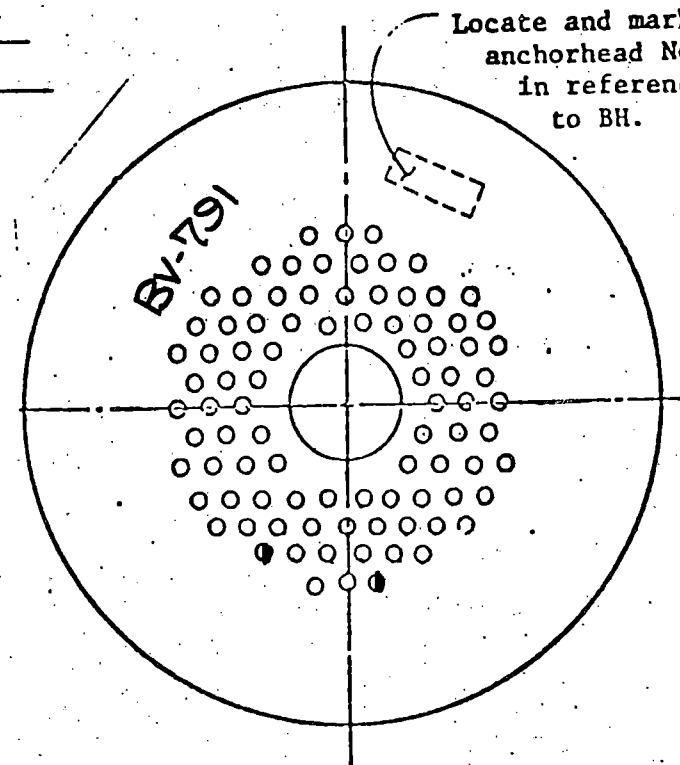
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No
in referenc
to BH.



Shop End	Field End
	Anchor Location
	✓

Filler Coverage		
	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	N/A
	Shims	GOOD
	Bearing Plate	GOOD*
	No. Off-Size BH	NONE
	No. of Split BH	2

Corrosion Level		
	Button Heads	1
	Anchor Head	1
	Bushing	N/A
	Shims	1
	Bearing Plate	1*

* Surface covered by
grease cap only.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ① Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

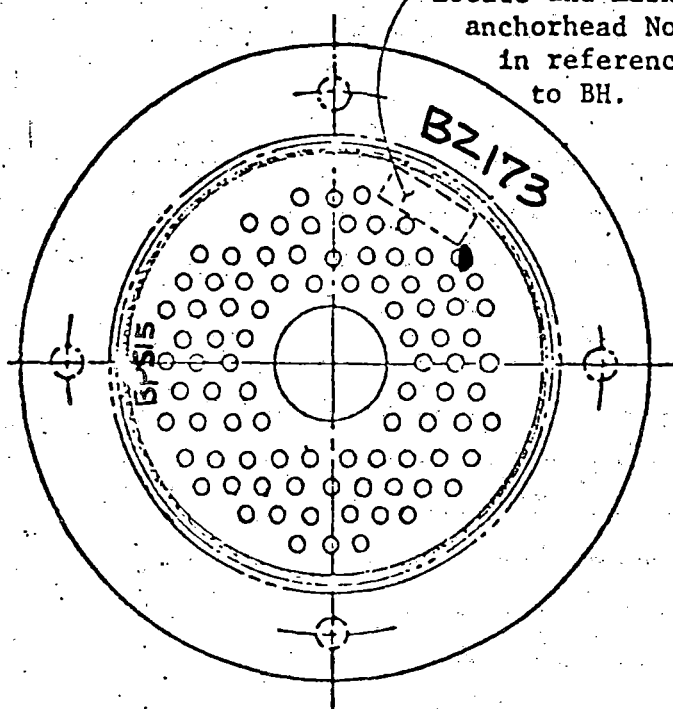
Tendon Identification D2-49

Date: 10-20-75 By: RT KRUPICKA

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.

B2173



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

Shop End	Anchor Location	Field End
✓		

Filler Coverage

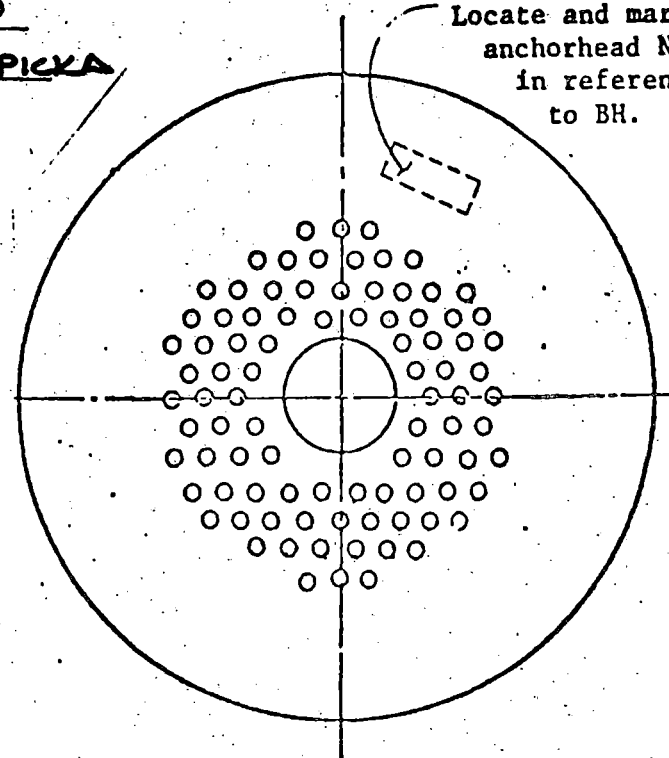
GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
1	No. of Split BH	

Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1	Bearing Plate	

* Surface covered by
grease cap only.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.


LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation—
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

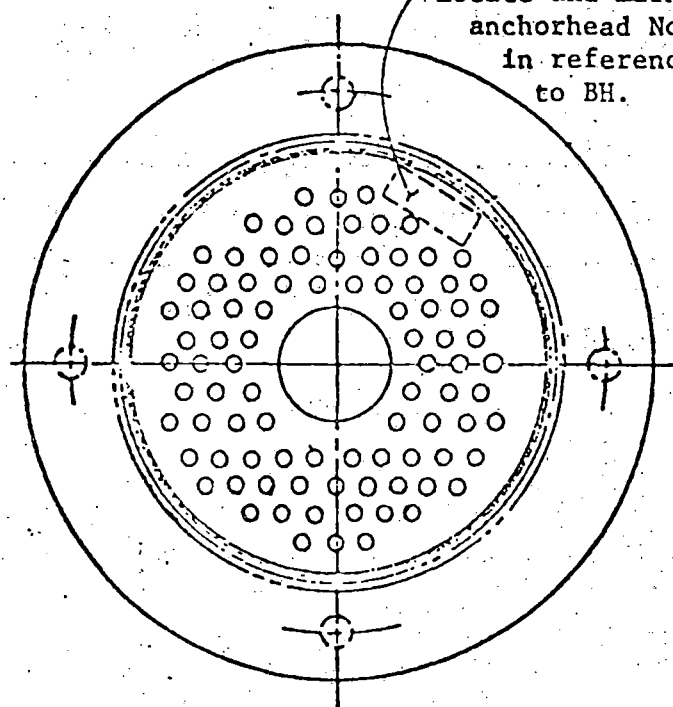
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D2-49

Date: 10-20-75 By: RT KRUPICKA

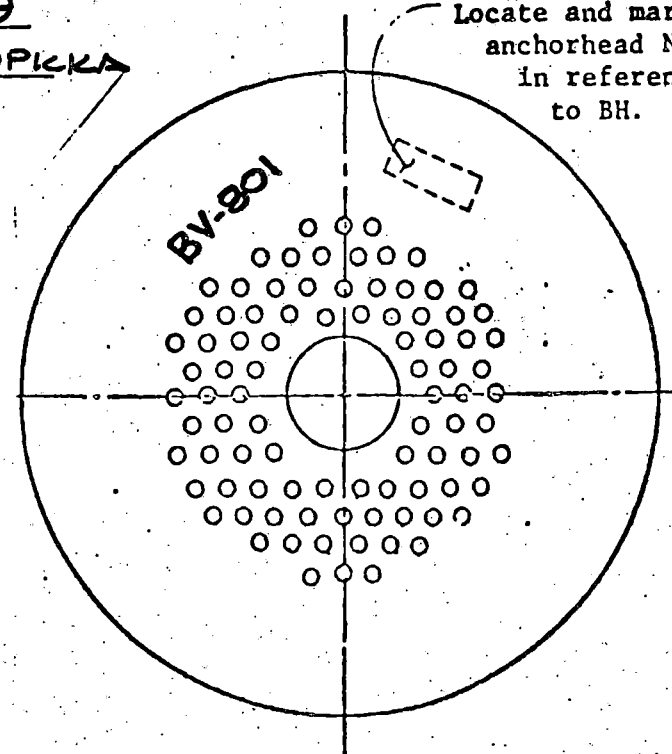
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in referen
to BH.



Shop End	Field End
Anchor Location	✓

Filler Coverage	
Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	N/A
Shims	GOOD
Bearing Plate	GOOD*
No. Off-Size BH	NONE
No. of Split BH	NONE

Corrosion Level	
Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	1 *

* Surface covered by
grease cap only.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ◐ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

PALM BEACHES PLANT

FIVE YEAR TENDON SURVEILLANCE

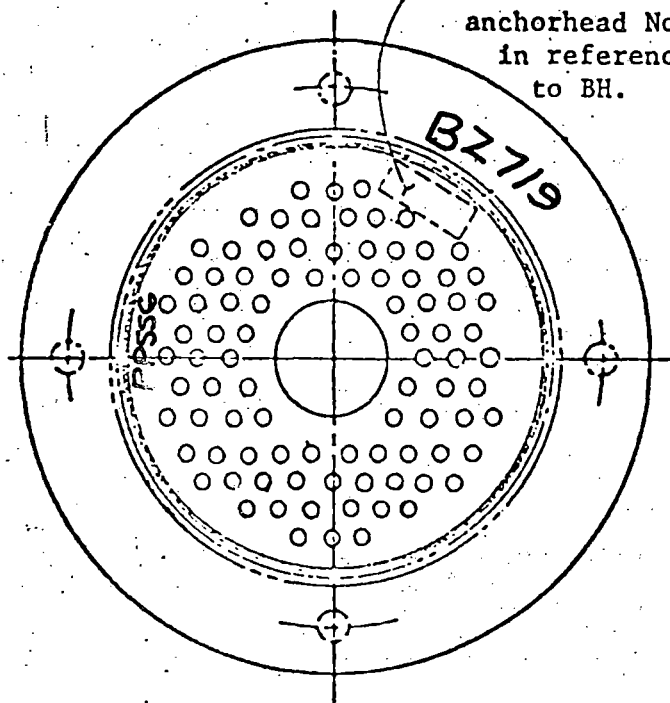
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification D3-40

Date: 10-16-75 By: RTK

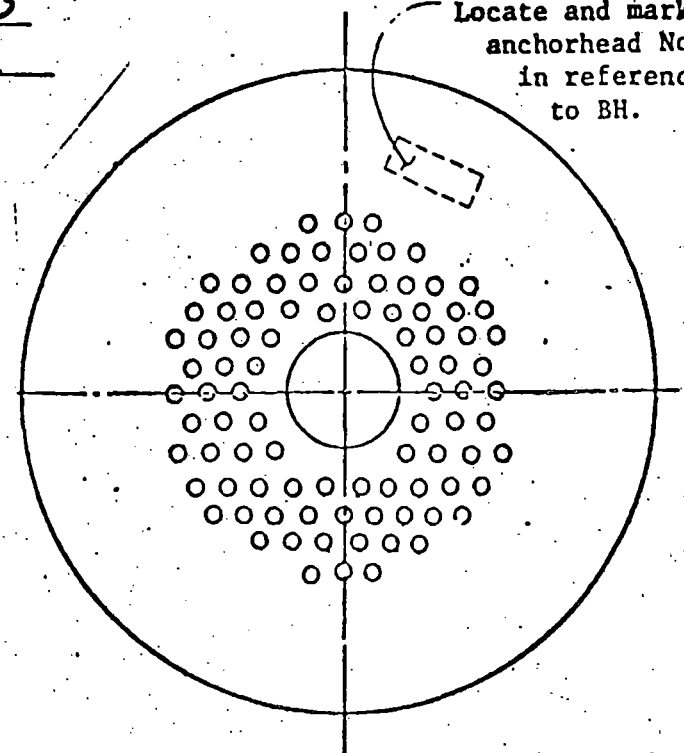
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

✓	Anchor Location	
---	-----------------	--

Filler Coverage

GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
NONE	No. of Split BH	

Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1*	Bearing Plate	

**SURFACE COVERED BY
GREASE CAP ONLY.**

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation—
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

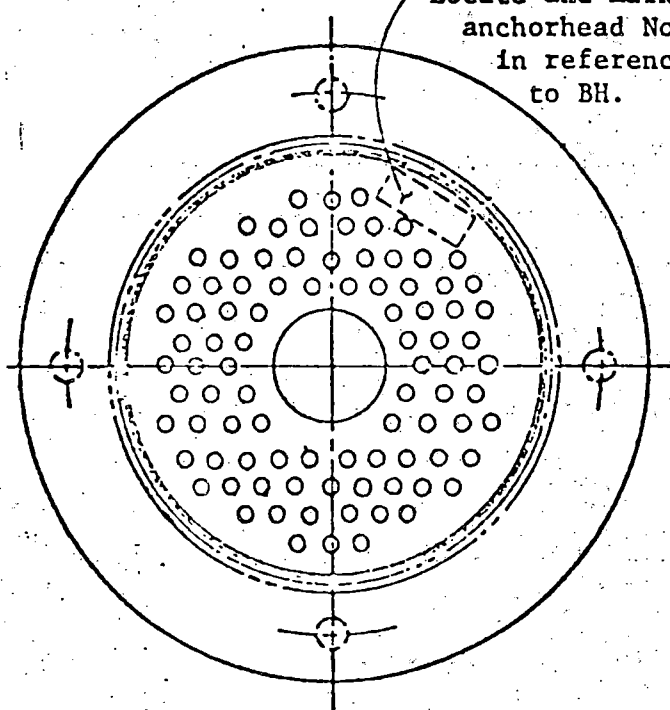
FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

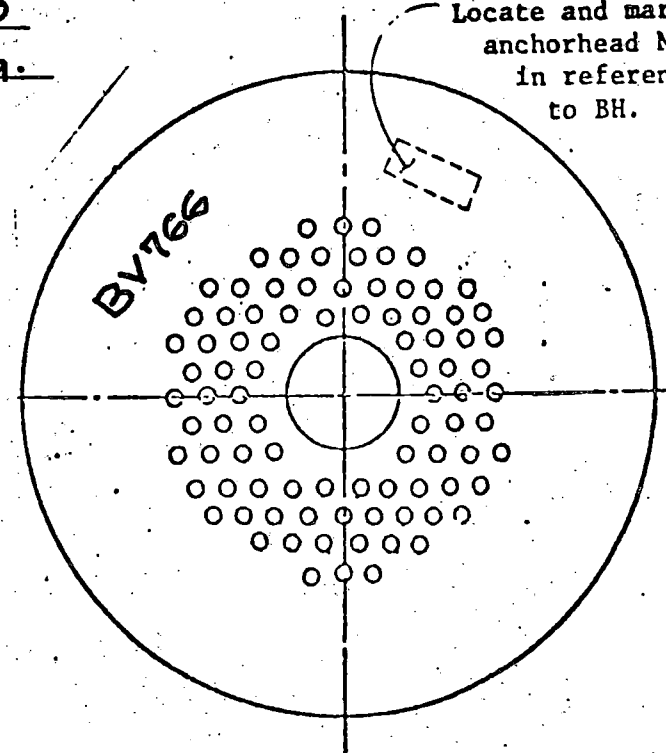
Tendon Identification D3-40

Date: 10-16-75 By: H.S.G.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.


FIELD END

Locate and mark
anchorhead No.
in reference
to BH.


Shop End	Field End
	Anchor Location
	✓

Filler Coverage

	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	N/A
	Shims	GOOD
	Bearing Plate	GOOD*
	No. Off-Size BH	NONE
	No. of Split BH	NONE

Corrosion Level

	Button Heads	1
	Anchor Head	1
	Bushing	N/A
	Shims	1
	Bearing Plate	2*

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊕ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation—
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE.

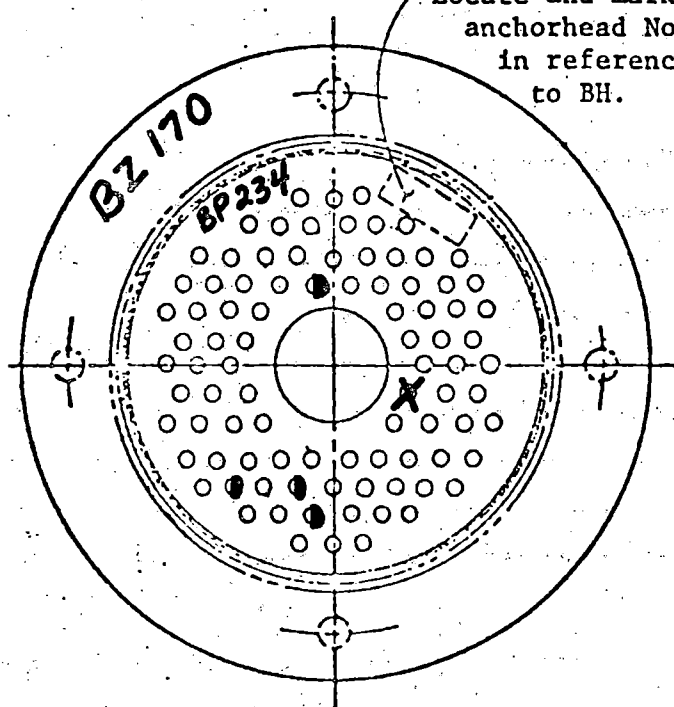
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification **D3-49**

Date: **10.14.75** By: **R.T.K.**

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.

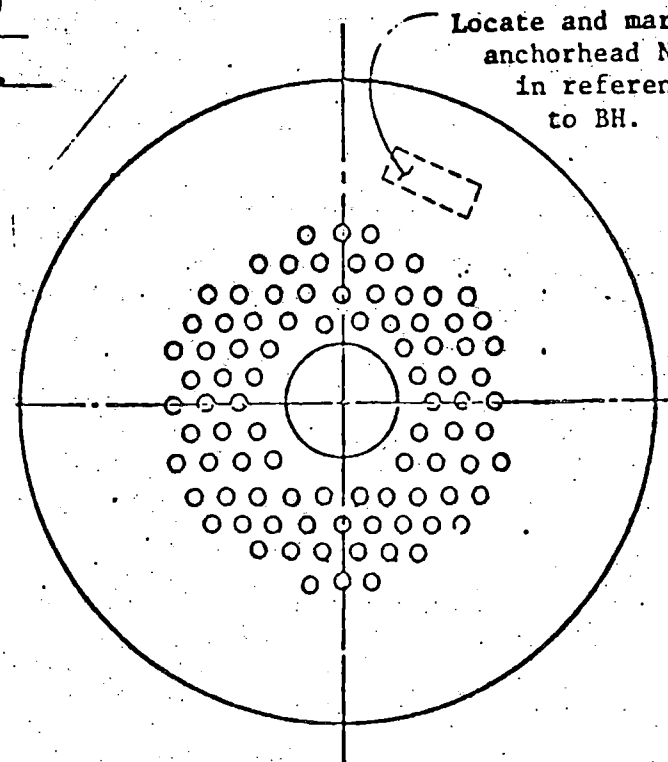


LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⌘ Discontinuous wire removed this surveillance.
- ⌘ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

FIELD END

Locate and mark
anchorhead No
in reference
to BH.



LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

Shop End	Field End
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Filler Coverage

GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD *	Bearing Plate	
NONE	No. Off-Size BH	
-4-	No. of Split BH	

Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
2	Shims	
1 *	Bearing Plate	

* SURFACE COVERED BY
GREASE CAP ONLY.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

PALM BEACHES PLANT

FIVE YEAR TENDON SURVEILLANCE

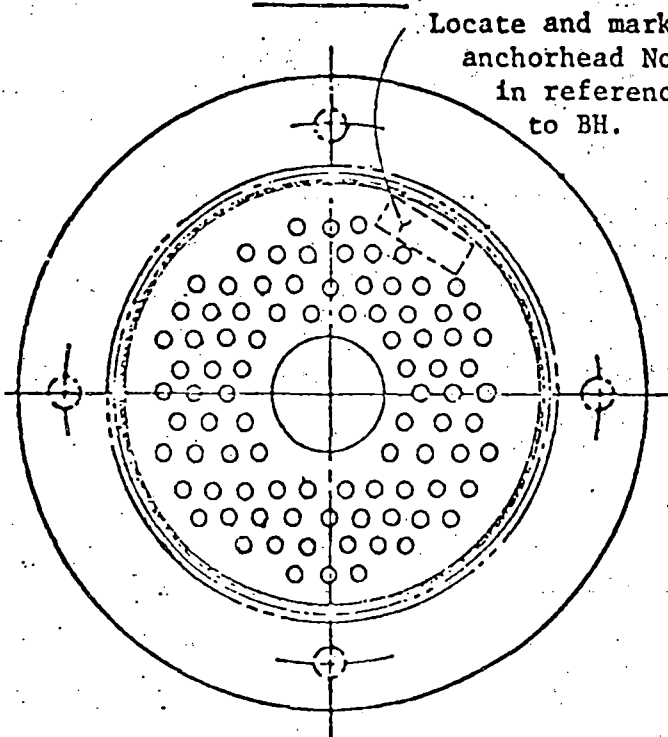
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification **03-49**

Date: **10.14.75** By: **H.S.G.**

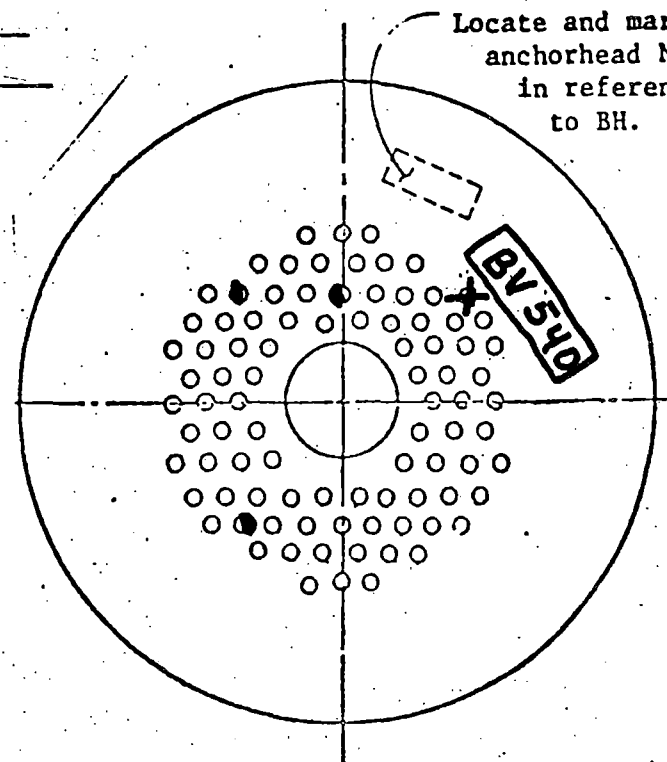
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊖ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

Shop End	Field End
	Anchor Location ✓
Filler Coverage	
Cap.	Good
Buttonheads	Good
Anchor Head	Good
Bushing	N/A
Shims	Good
Bearing Plate	Good *
No Off-Size BH	2-sm.
No. of Split BH	-1-

Corrosion Level	
Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

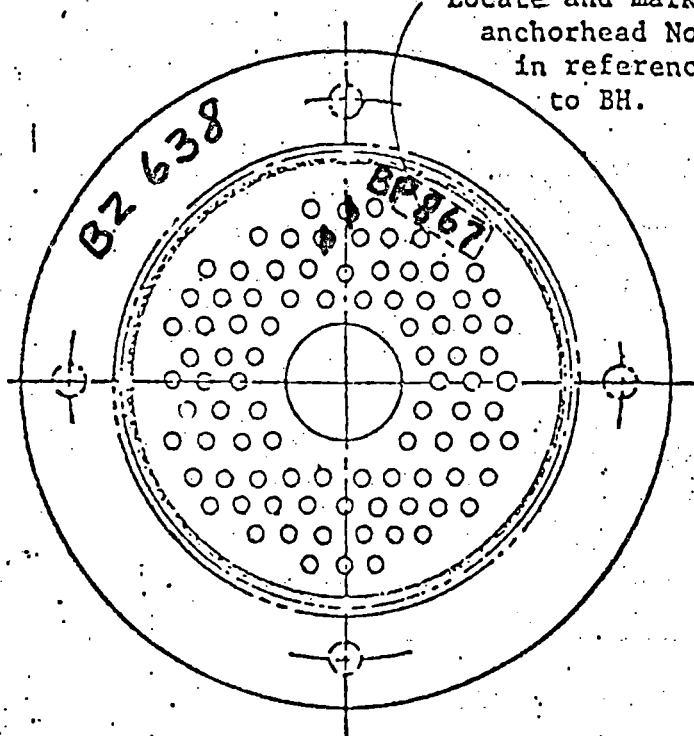
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 49 EA

Date: 12.2.75 By: H.S.G.

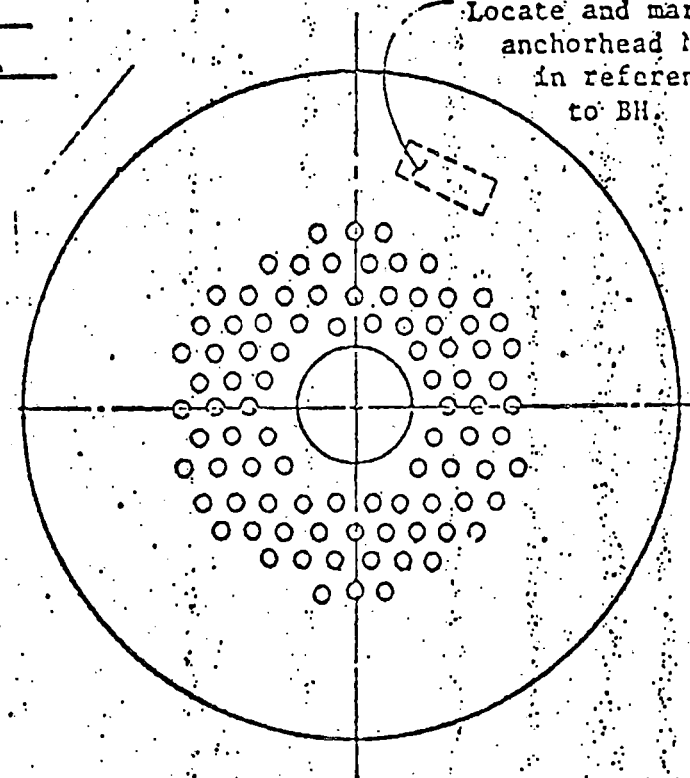
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead N
in reference
to BH.



Shop End Field End

✓	Anchor Location		
---	-----------------	--	--

Filler Coverage

GOOD	Cap		
GOOD	Buttonheads		
GOOD	Anchor Head		
GOOD	Bushing		
GOOD	Shims		
GOOD *	Bearing Plate		
NONE	No. Off-Size BH		
2	No. of Split BH		

Corrosion Level

1	Button Heads		
1	Anchor Head		
1	Bushing		
1	Shims		
1 *	Bearing Plate		

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 49 EA

FIELD END: ()

SHOP END: (X)

90 Button heads were inspected by the undersigned

and 90 DO ~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry J. Gorawski

DATE: 12.2.75

FIVE YEAR TENDON SURVEILLANCE

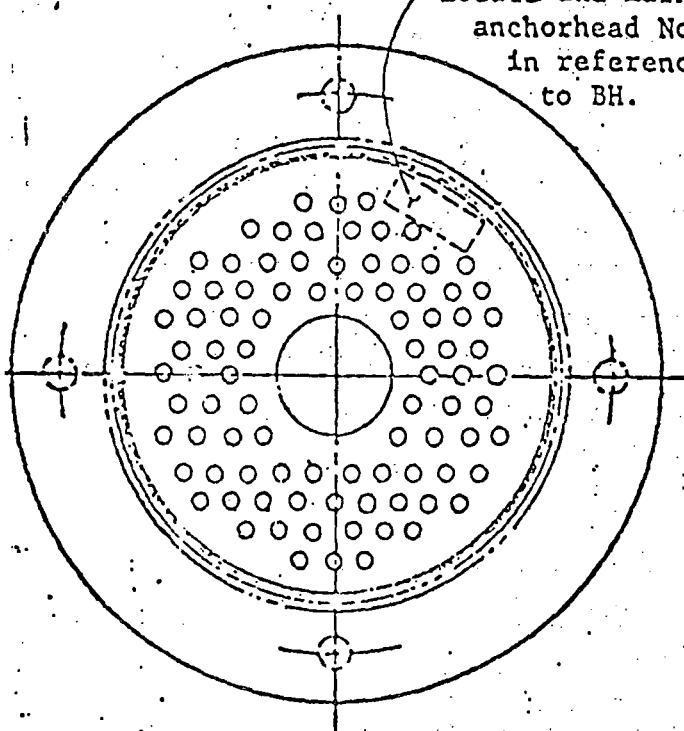
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 49EA

Date: 12.2.75 By: D.W.

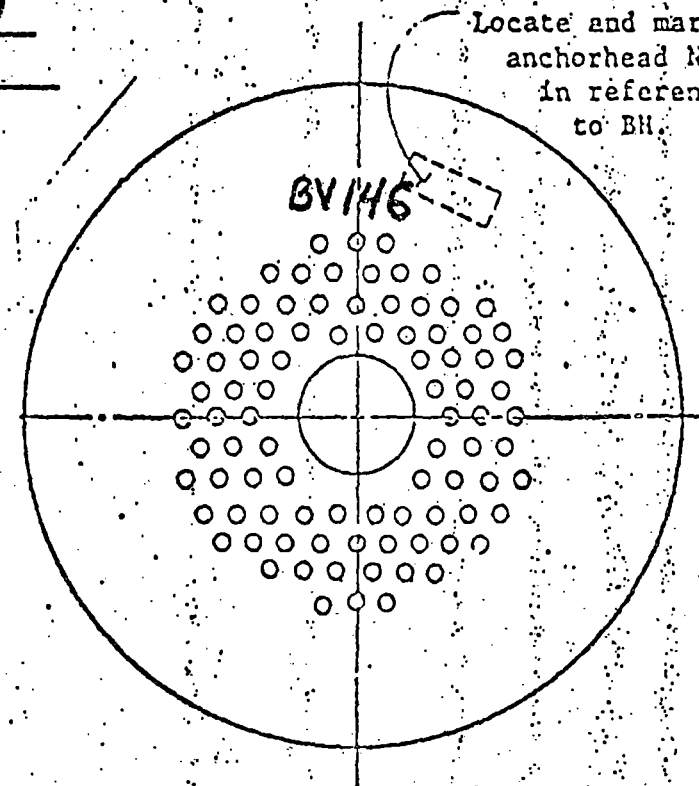
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

	Anchor Location	✓
--	-----------------	---

Filler Coverage

	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	—
	Shims	GOOD
	Bearing Plate	GOOD *
	No. Off-Size BH	NONE
	No. of Split BH	NONE

Corrosion Level

	Button Heads	1
	Anchor Head	1
	Bushing	1
	Shims	1
	Bearing Plate	2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS.

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ✗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊕ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

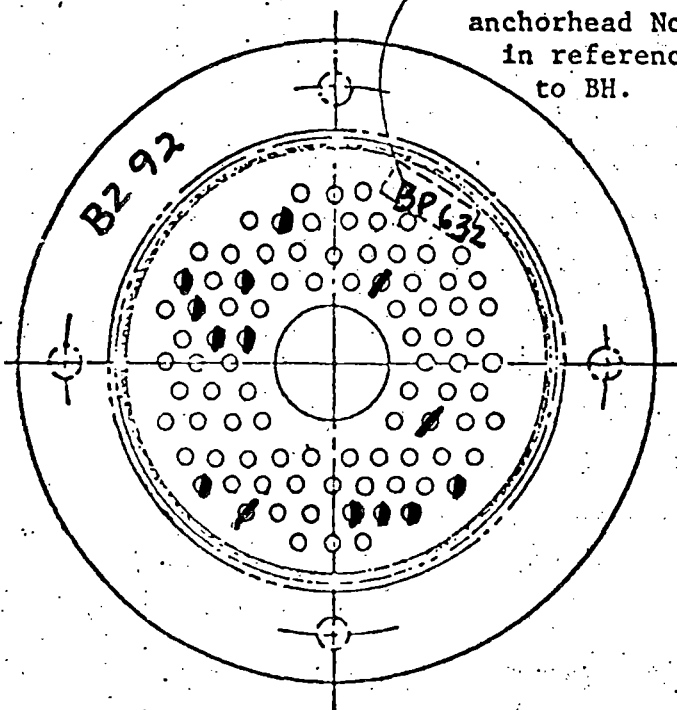
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 59 BD

Date: 11.17.75 By: WOODY

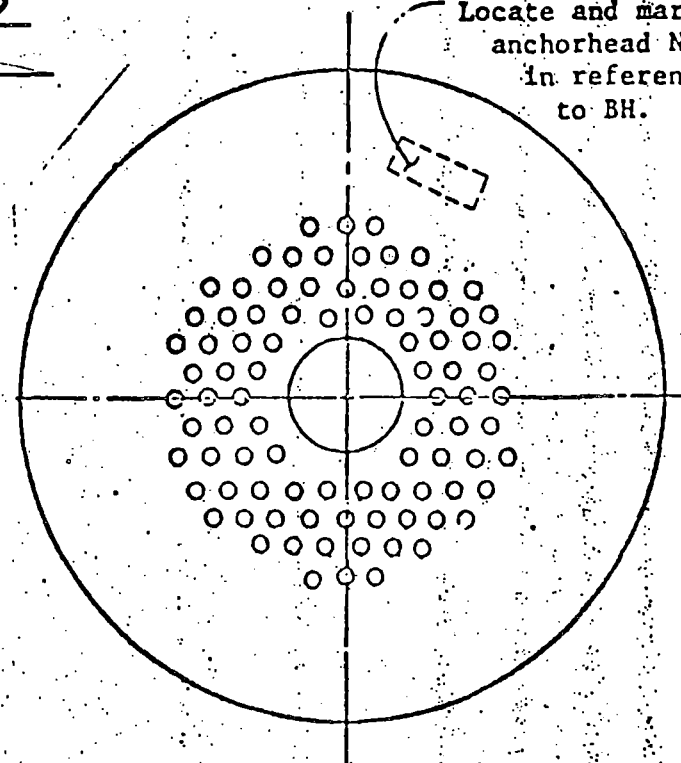
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
✓	Anchor Location

Filler Coverage	
Good	Cap
Good	Buttonheads
Good	Anchor Head
Good	Bushing
Good	Shims
Good *	Bearing Plate
NONE	No. Off-Size BH
11	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
1 *	Bearing Plate

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

* SURFACE COVERED BY GREASE CAP ONLY.

3 DISCONTINUOUS WIRES REMOVED.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 59 BD

FIELD END: ()

SHOP END: (X)

87 Button heads were inspected by the undersigned

and 87 DO
— ~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry S. Gorawski

DATE: 11.17.75

FIVE YEAR TENDON SURVEILLANCE

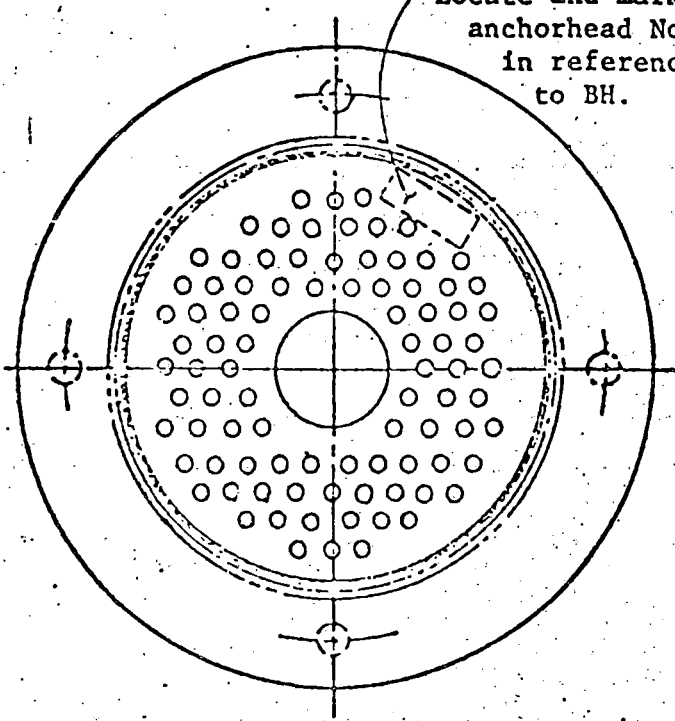
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 59 BD

Date: 11.17.75 By: H.S.G.

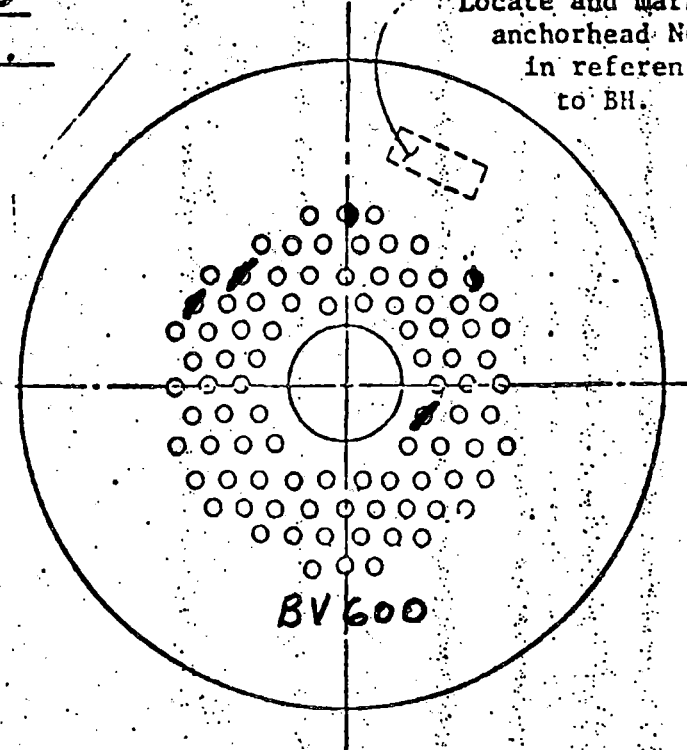
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

Shop End	Field End
	Anchor Location
	✓
	Filler Coverage
	Cap
	GOOD
	Buttonheads
	GOOD
	Anchor Head
	GOOD
	Bushing
	—
	Shims
	GOOD
	Bearing Plate
	GOOD *
	No. Off-Size BH
	NONE
	No. of Split BH
	2

Corrosion Level
Button Heads
1
Anchor Head
1
Bushing
—
Shims
1
Bearing Plate
2 *

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

* SURFACE COVERED BY GREASE CAP ONLY.
3 DISCONTINUOUS WIRES REMOVED.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 59 BD

FIELD END: (X)

SHOP END: ()

87 Button heads were inspected by the undersigned

and 87 DO
DO NOT meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry J. Gorawski

DATE: 11. 17. 75

FIVE YEAR TENDON SURVEILLANCE

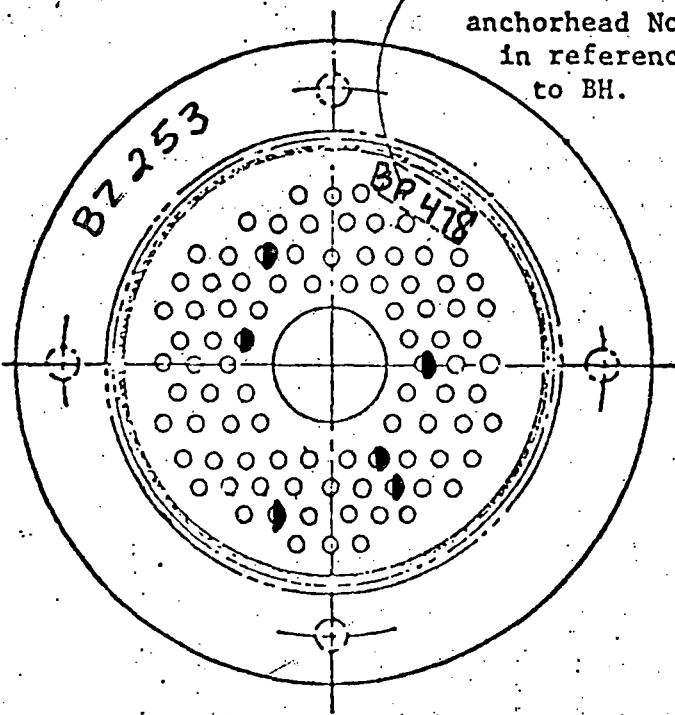
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 63BD

Date: 11.18.75 By: L.G.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
<input checked="" type="checkbox"/>	<input type="checkbox"/>

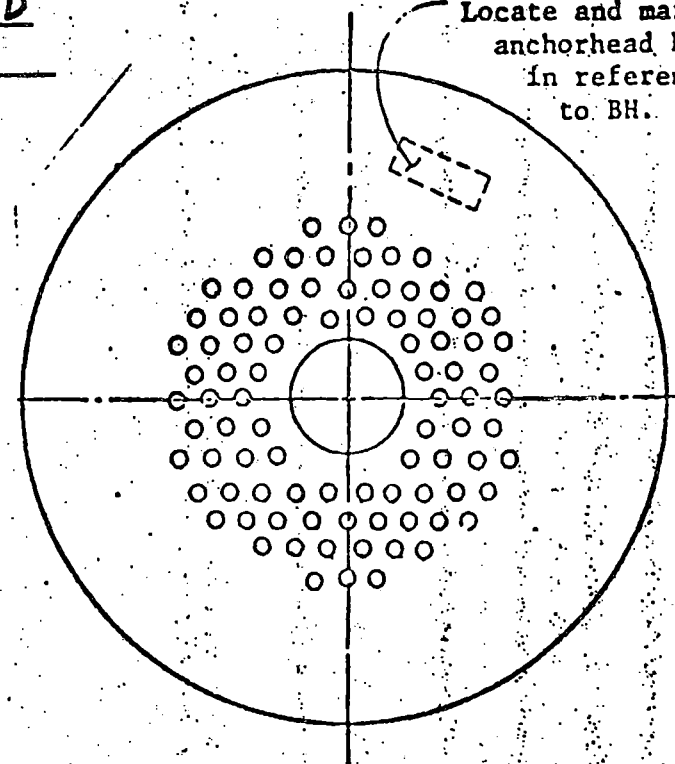
Filler Coverage	
GOOD	Cap
GOOD	Buttonheads
GOOD	Anchor Head
GOOD	Bushing
GOOD	Shims
GOOD *	Bearing Plate
NONE	No. Off-Size BH
6	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
*1	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

FIELD END

Locate and mark
anchorhead N
in referen
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 0 < pitting ≤ .003"
- #4 .003" < pitting ≤ .006"
- #5 .006" < pitting ≤ .010"

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600



Post Tensioning Division

November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 63 BD

FIELD END: ()

SHOP END: (X)

90 Button heads were inspected by the undersigned

and 90 DO
— ~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry J. Geramsh

DATE: 11.18.75

FIVE YEAR TENDON SURVEILLANCE

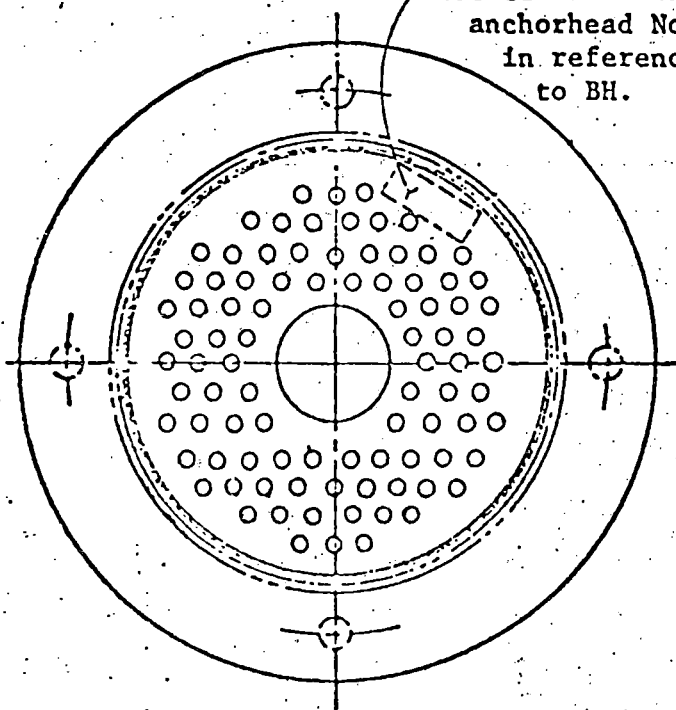
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 63 BD

Date: 11.18.75 By: H.S.G.

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

	Anchor Location	✓
--	-----------------	---

Filler Coverage

	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	—
	Shims	GOOD
	Bearing Plate	GOOD *
	No. Off-Size BH	NONE
	No. of Split BH	NONE

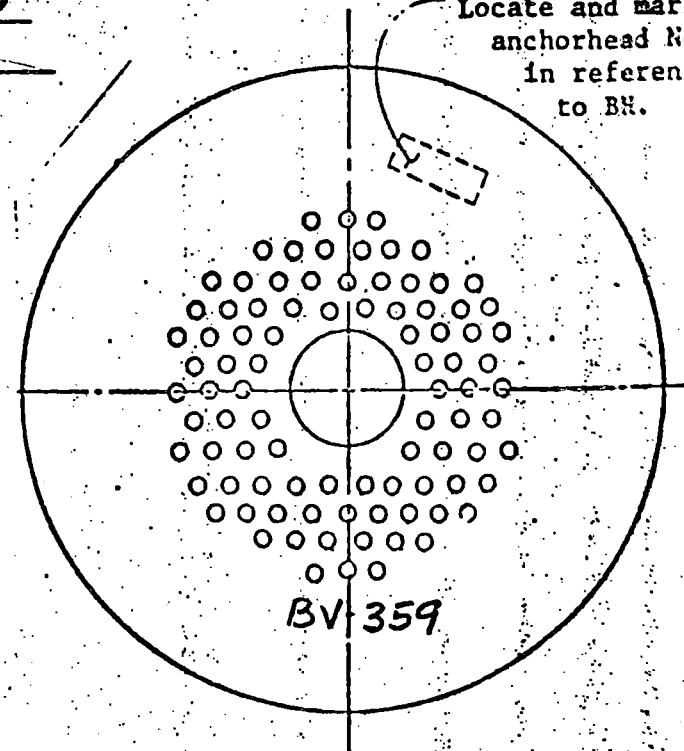
Corrosion Level

	Button Heads	1
	Anchor Head	1
	Bushing	—
	Shims	1
	Bearing Plate	2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ✗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ① Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

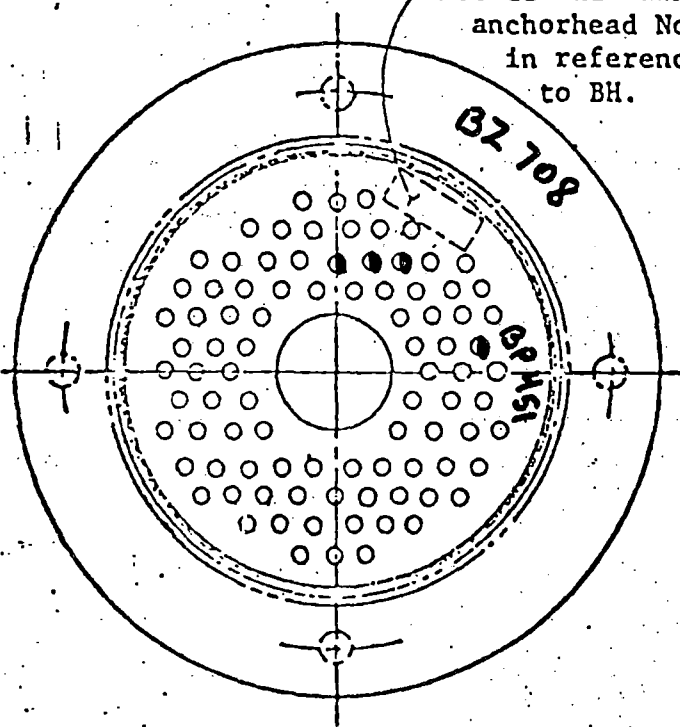
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 80 BD

Date: 11.19.75 By: H.S.G.

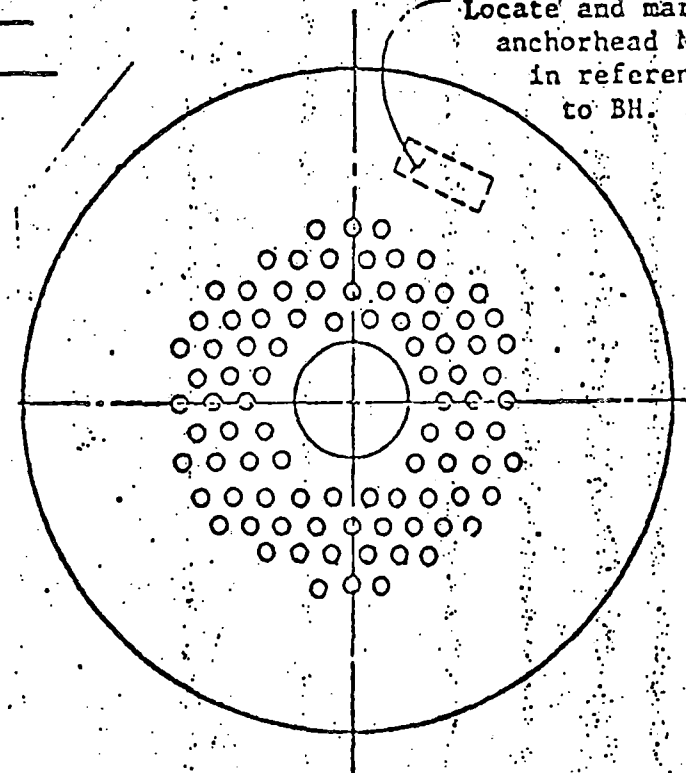
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead N
in referen
to BH.



Shop End	Field End
✓	Anchor Location
Filler Coverage	
GOOD	Cap
GOOD	Buttonheads
GOOD	Anchor Head
GOOD	Bushing
GOOD	Shims
GOOD*	Bearing Plate
NONE	No. Off-Size BH
4	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
* 1	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600



Post Tensioning Division

November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 80 BD

FIELD END: ()

SHOP END: (X)

90 Button heads were inspected by the undersigned

and 90 DO ~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry J. Gorawski

DATE: 11.19.75

FIVE YEAR TENDON SURVEILLANCE

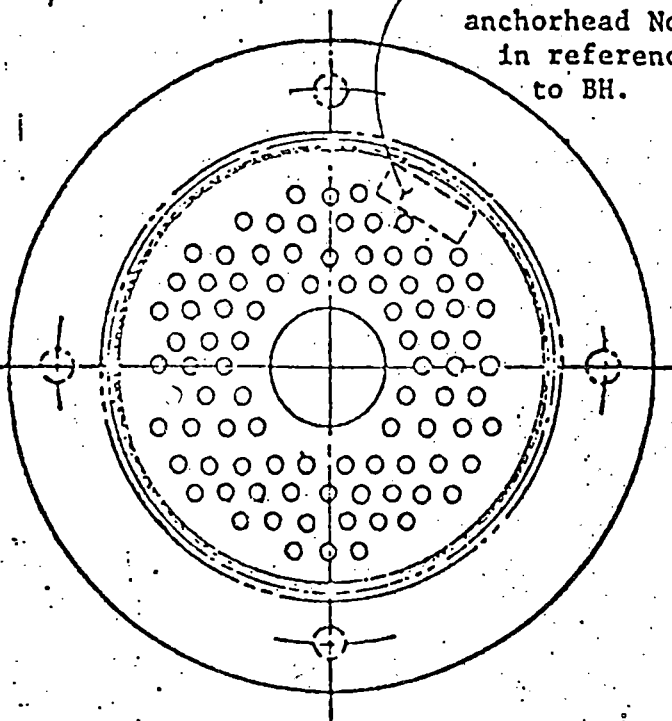
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 80 BD

Date: 11.19.75 By: F.C

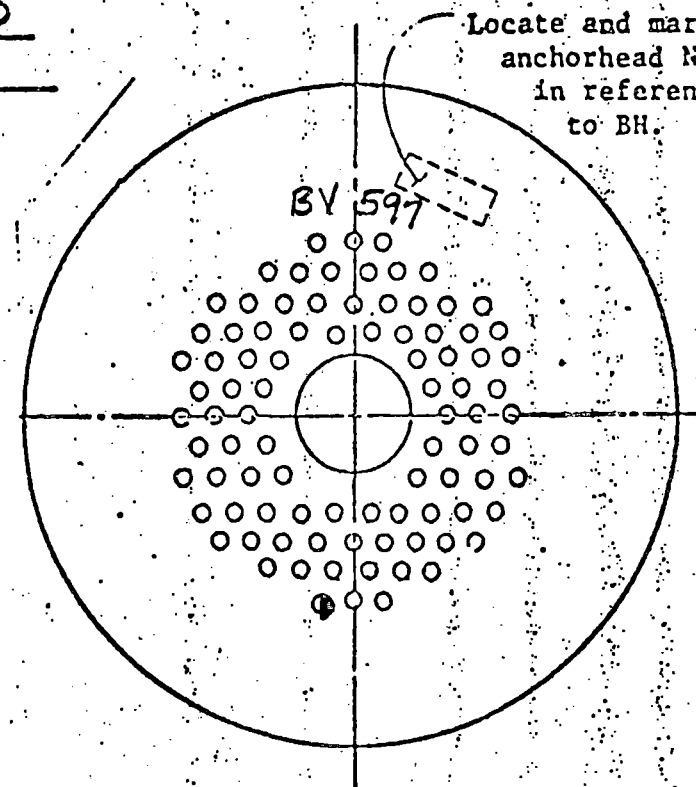
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

	Anchor Location	✓
--	-----------------	---

Filler Coverage

	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	—
	Shims	GOOD
	Bearing Plate	GOOD *
	No. Off-Size BH	NONE
	No. of Split BH	1

Corrosion Level

	Button Heads	1
	Anchor Head	1
	Bushing	—
	Shims	1
	Bearing Plate	1 *

SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊕ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600



INRYCO
an INLAND STEEL company

Post Tensioning Division

November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 80 BD

FIELD END: (X)

SHOP END: ()

90 Button heads were inspected by the undersigned

and 90 DO ~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry S. Gorawski

DATE: 11.19.75

FIVE YEAR TENDON SURVEILLANCE

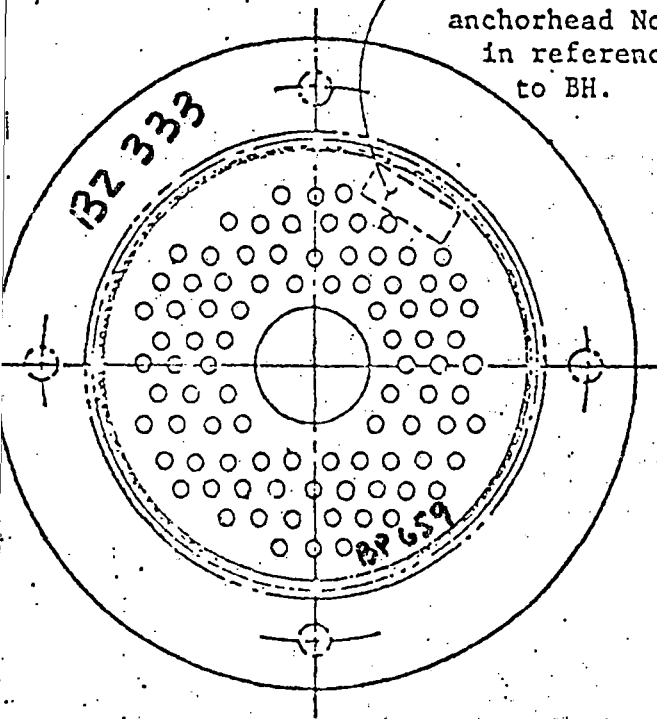
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 66 BF

Date: 11.24.75 By: H.S.G.

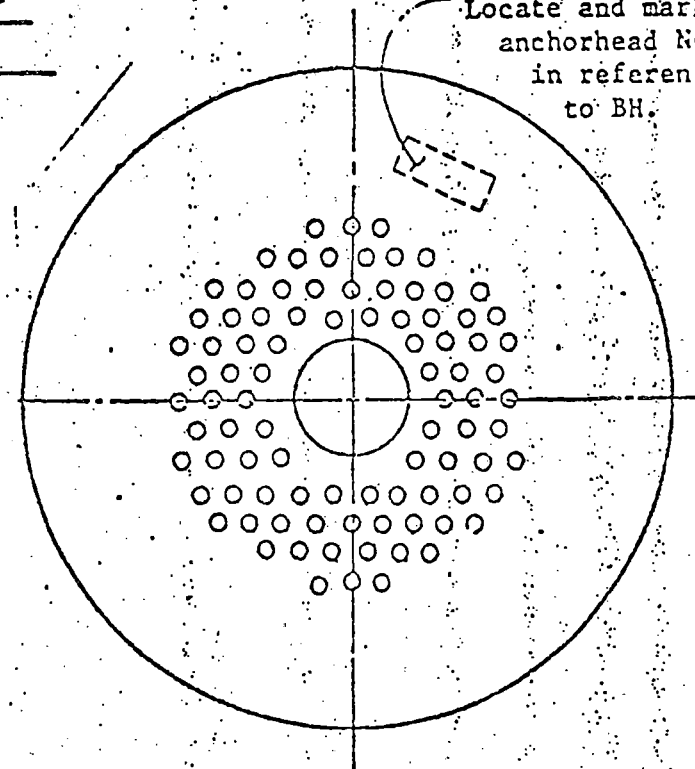
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Filler Coverage	
GOOD	Cap
GOOD	Buttonheads
GOOD	Anchor Head
GOOD	Bushing
GOOD	Shims
GOOD *	Bearing Plate
NONE	No. Off-Size BH
NONE	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
* 1	Bearing Plate

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- L) Large buttonhead.
- S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

* SURFACE COVERED BY
GREASE CAP ONLY.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

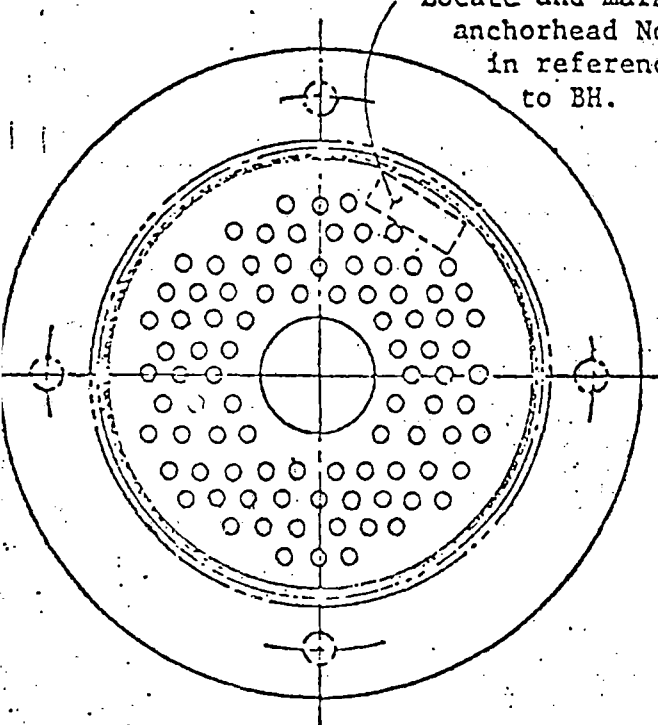
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 66 BF

Date: 11.24.75 By: L.G.

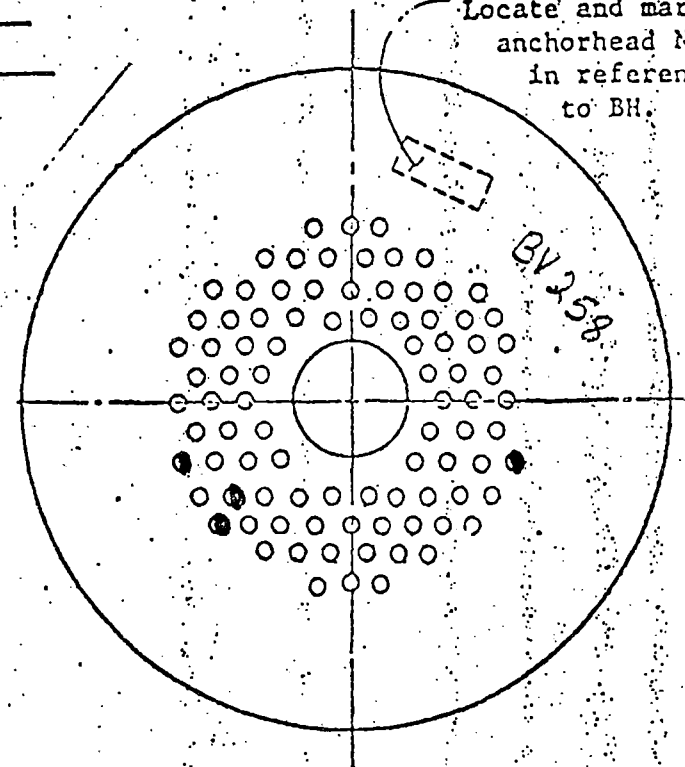
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

	Anchor Location	✓
--	-----------------	---

Filler Coverage

	Cap	GOOD
	Buttonheads	GOOD
	Anchor Head	GOOD
	Bushing	—
	Shims	GOOD
	Bearing Plate	GOOD *
	No. Off-Size BH	NONE
	No. of Split BH	4

Corrosion Level

	Button Heads	1
	Anchor Head	1
	Bushing	1
	Shims	1
	Bearing Plate	2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS.

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- L) Large buttonhead.
- S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600



Post Tensioning Division

November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 66 BF

FIELD END: (X)

SHOP END: ()

90 Button heads were inspected by the undersigned

and 90 ~~DO NOT~~ ^{DO} meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry J. Gorawski

DATE: 11.24.75

FIVE YEAR TENDON SURVEILLANCE

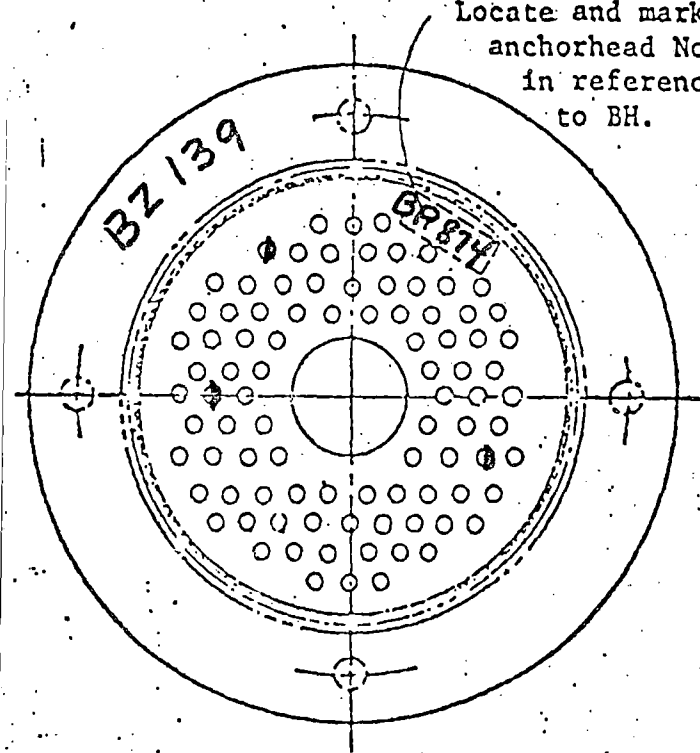
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 71 BF

Date: 11.25.75 By: H.S.G.

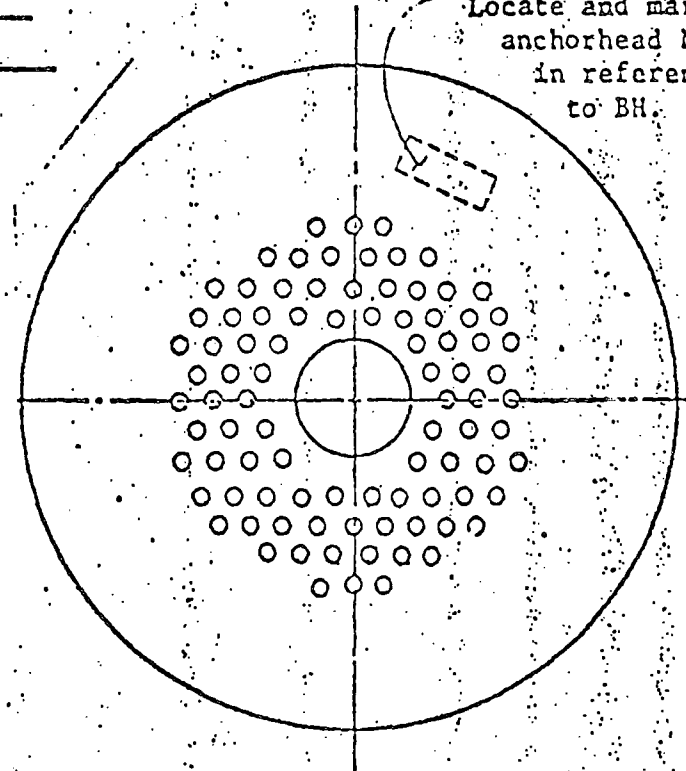
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
<input checked="" type="checkbox"/>	<input type="checkbox"/>

Anchor Location

Filler Coverage

GOOD	Cap		
GOOD	Buttonheads		
GOOD	Anchor Head		
GOOD	Bushing		
GOOD	Shims		
GOOD *	Bearing Plate		
NONE	No. Off-Size BH		
3	No. of Split BH		

Corrosion Level

1	Button Heads		
1	Anchor Head		
1	Bushing		
1	Shims		
* 2	Bearing Plate		

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 71 BF

FIELD END: ()

SHOP END: (X)

90 Button heads were inspected by the undersigned

and 90 DO
~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry S. Gorawski

DATE: 11.25.75

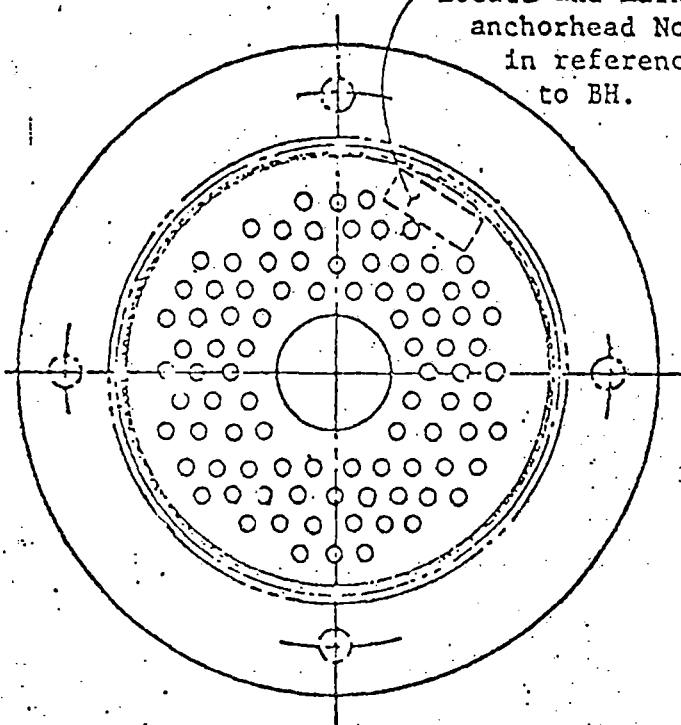
PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 71BF
Date: 11.25.75 By: L. G.

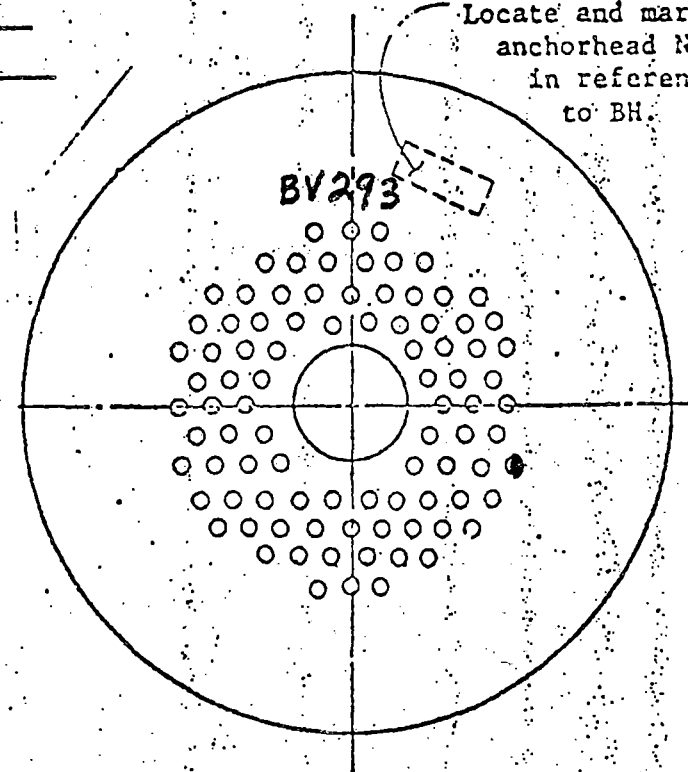
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
	Anchor Location ✓
Filler Coverage	
	Cap GOOD
	Buttonheads GOOD
	Anchor Head GOOD
	Bushing —
	Shims GOOD
	Bearing Plate GOOD *
	No. Off-Size BH NONE
	No. of Split BH 1

Corrosion Level	
	Button Heads 1
	Anchor Head 1
	Bushing 1
	Shims 1
	Bearing Plate 2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊖ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

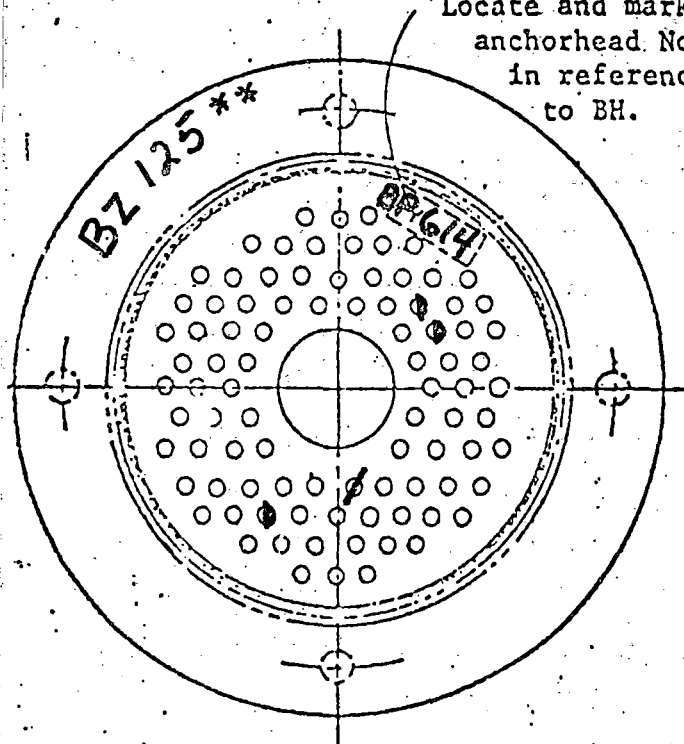
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 79 BF

Date: 11.26.75 By: H.S.G.

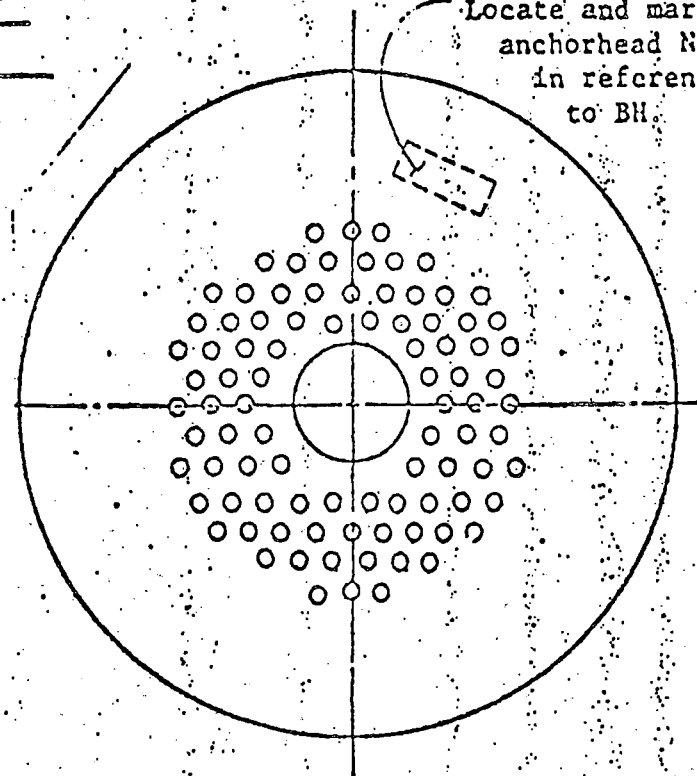
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
✓	Anchor Location

Filler Coverage	
Good	Cap
Good	Buttonheads
Good	Anchor Head
Good	Bushing
Good	Shims
Good *	Bearing Plate
NONE	No. Off-Size BH
3	No. of Split BH

Corrosion Level	
1	Button Heads
1	Anchor Head
1	Bushing
1	Shims
* 1	Bearing Plate

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS.

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊗ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 0 < pitting ≤ .003"
- #4 .003" < pitting ≤ .006"
- #5 .006" < pitting ≤ .010"

** ORIGINAL FIELD RECORDS SHOW No. BZ-142.

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 19, 1975

BUTTON HEAD INSPECTION:

TENDON NO: 79 BF

FIELD END: ()

SHOP END: (X)

89 Button heads were inspected by the undersigned

and 89 DO ~~DO NOT~~ meet the standards established in

BUTTON HEAD CRITERIA 1610 to develop ultimate strength
of wire.

Inspected by: Henry J. Gorawski

DATE: 11.26.75

FIVE YEAR TENDON SURVEILLANCE

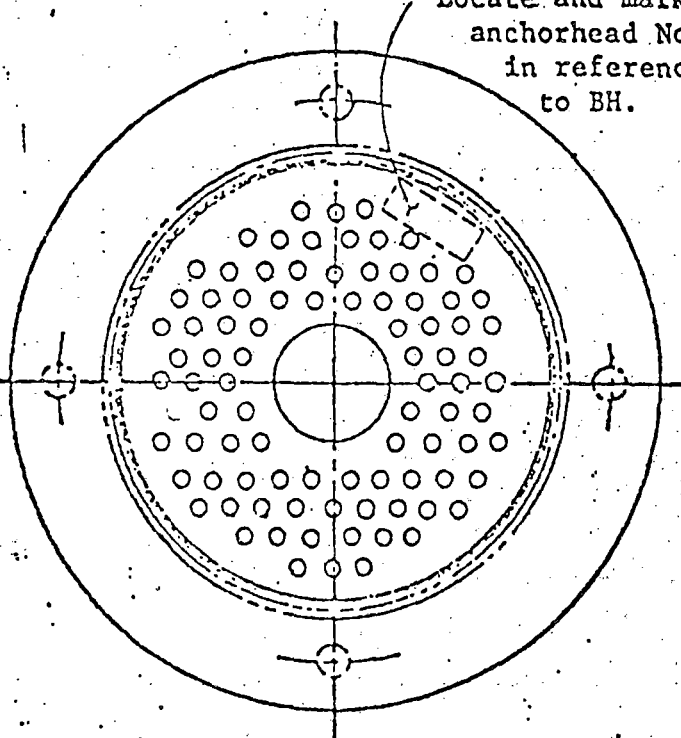
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 79 BF

Date: 11.26.75 By: L. G.

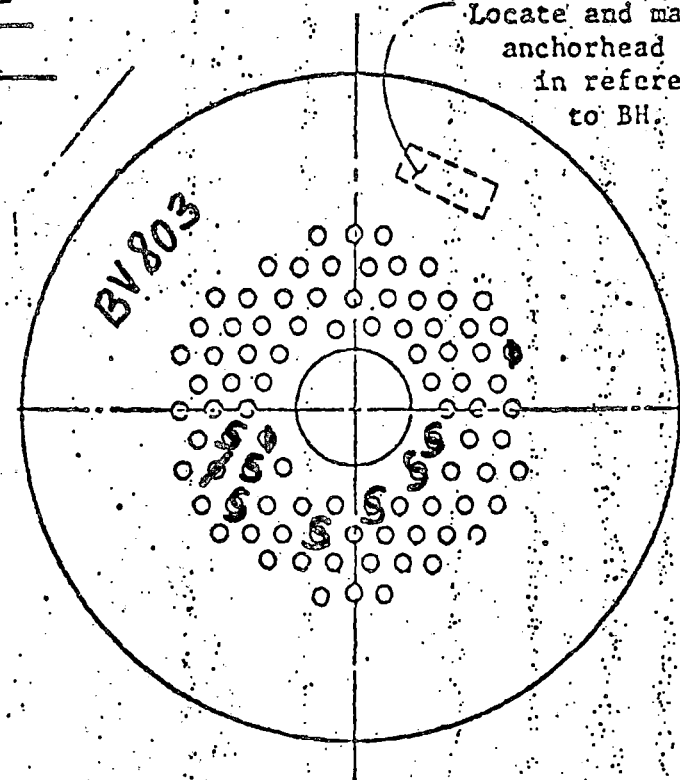
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
	Anchor Location

Filler Coverage	
Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	—
Shims	GOOD
Bearing Plate	GOOD *
No. Off-Size BH	7 SMALL
No. of Split BH	2

Corrosion Level	
Button Heads	1
Anchor Head	1
Bushing	1
Shims	1
Bearing Plate	2 *

* SURFACE COVERED BY
GREASE CAP ONLY.

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ✗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

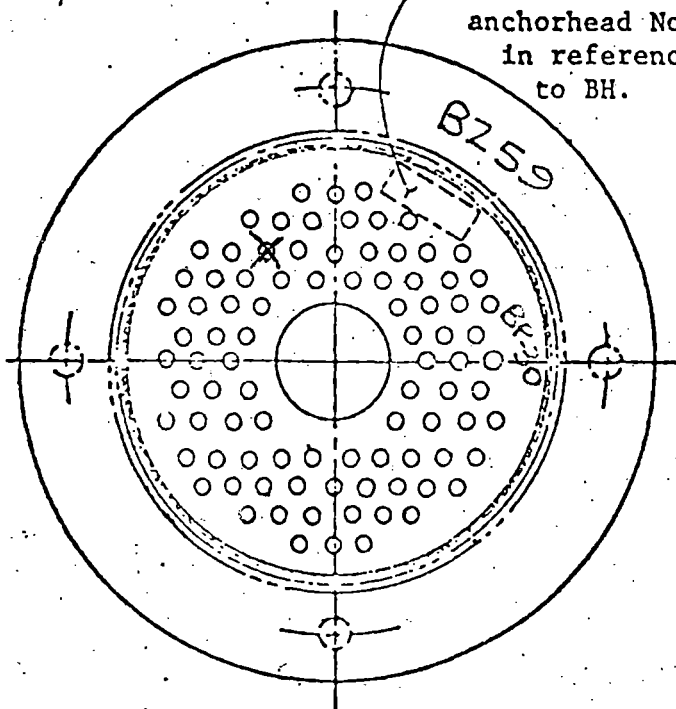
FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 56 DFDate: 10-30-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.

Shop End

Field End

<input checked="" type="checkbox"/>	Anchor Location	
-------------------------------------	-----------------	--

Filler Coverage

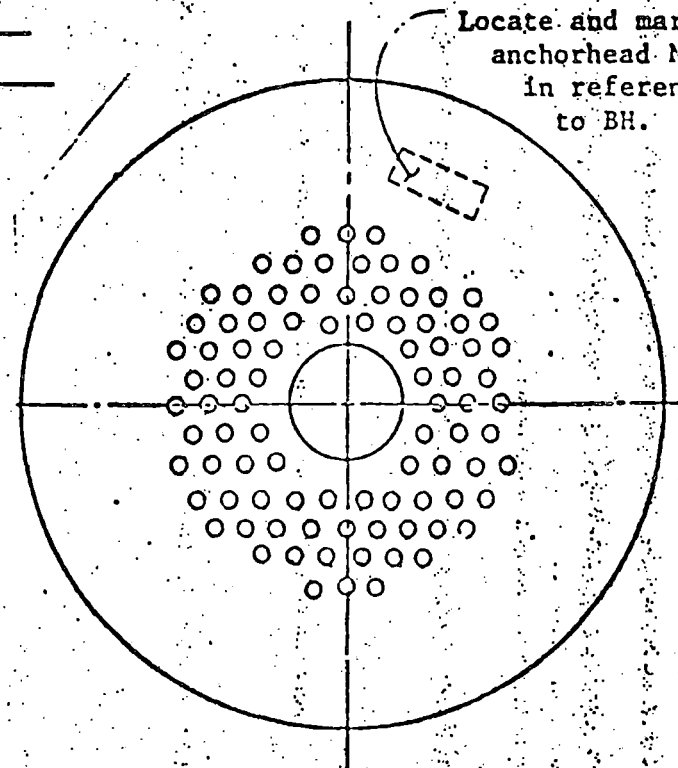
GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
NONE	No. of Split BH	

Corrosion Level

1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1 *	Bearing Plate	

* Surface covered by
grease only

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003''$
- #4 $.003'' < \text{pitting} \leq .006''$
- #5 $.006'' < \text{pitting} \leq .010''$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

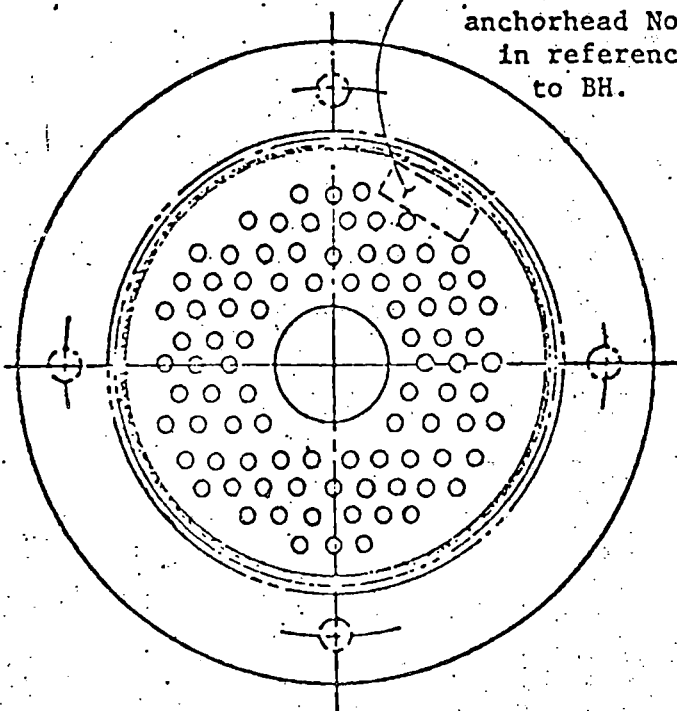
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 5GDF

Date: 10-30-75 By: RTK

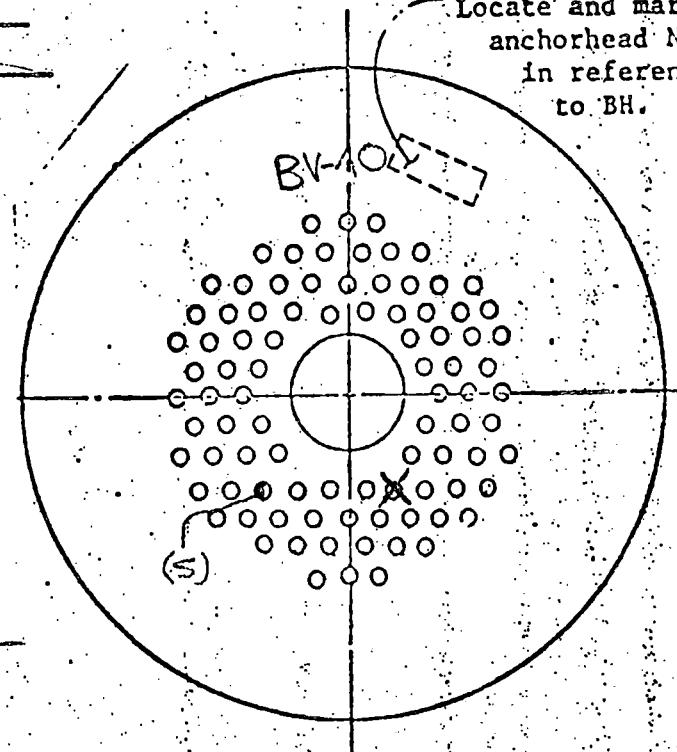
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End	Field End
Anchor Location	✓

Filler Coverage	
Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	N/A
Shims	GOOD
Bearing Plate	GOOD *
No. Off-Size BH	1 SMALL
No. of Split BH	NONE

Corrosion Level	
Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	1 *

* Surface covered in
grease esp. on BH

LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⊗ Discontinuous wire removed this surveillance.
- ✗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

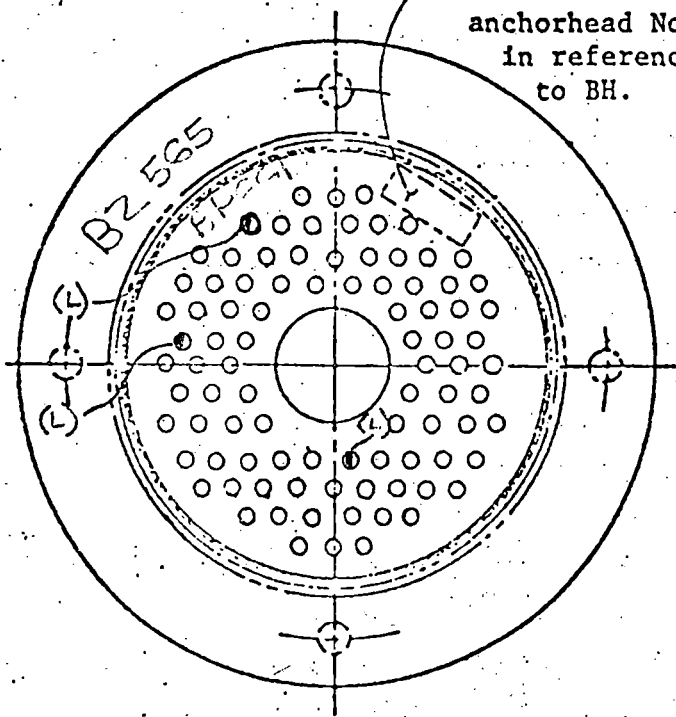
FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

Tendon Identification G8DF

Date: 11-4-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.


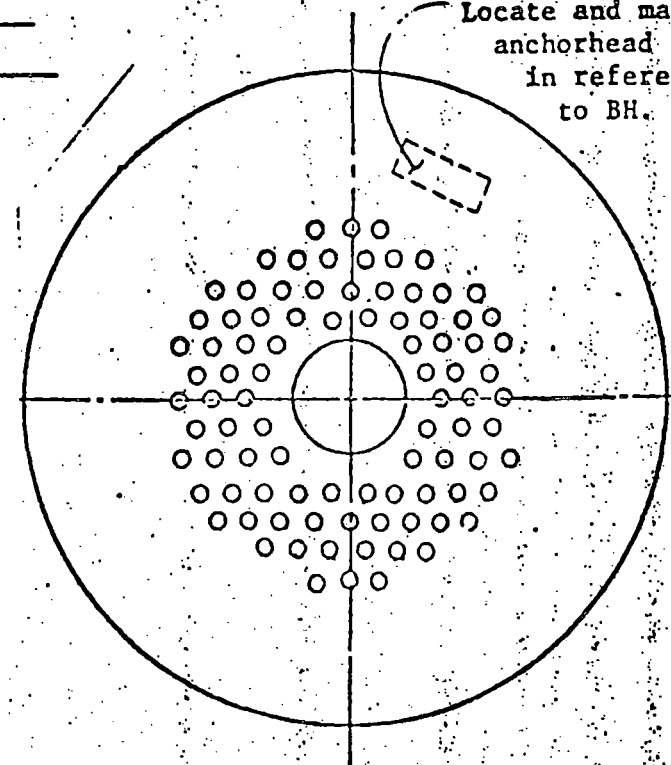
Shop End	Field End
✓	Anchor Location

Filler Coverage		
GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
3-LARGE	No. Off-Size BH	
1	No. of Split BH	

Corrosion Level		
1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1*	Bearing Plate	

* Surface covered by
grease on p. only.

FIELD END

Locate and mark
anchorhead N
in referen
to BH.


LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

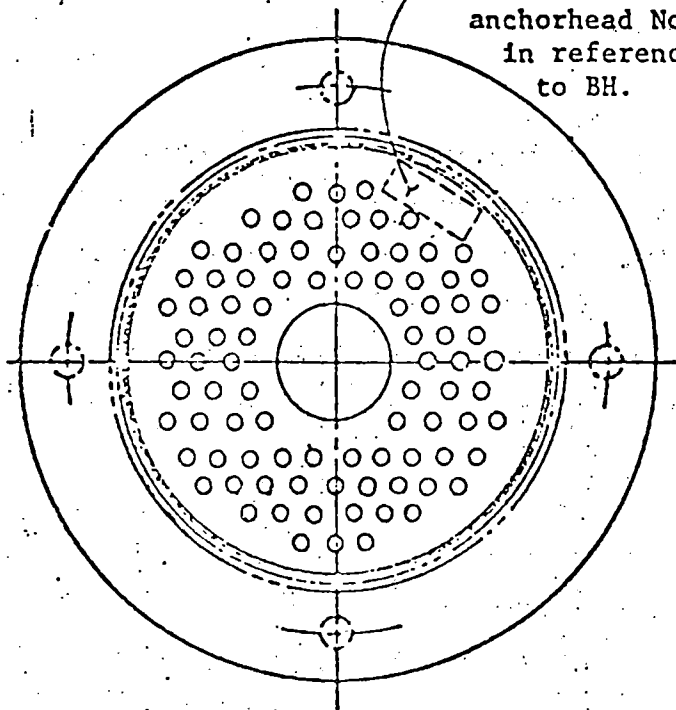
FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

TENDON WIRE ANCHORAGE SKETCH

Tendon Identification G8DFDate: 11-4-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊕ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

Shop End	Field End
Anchor Location	✓

Filler Coverage

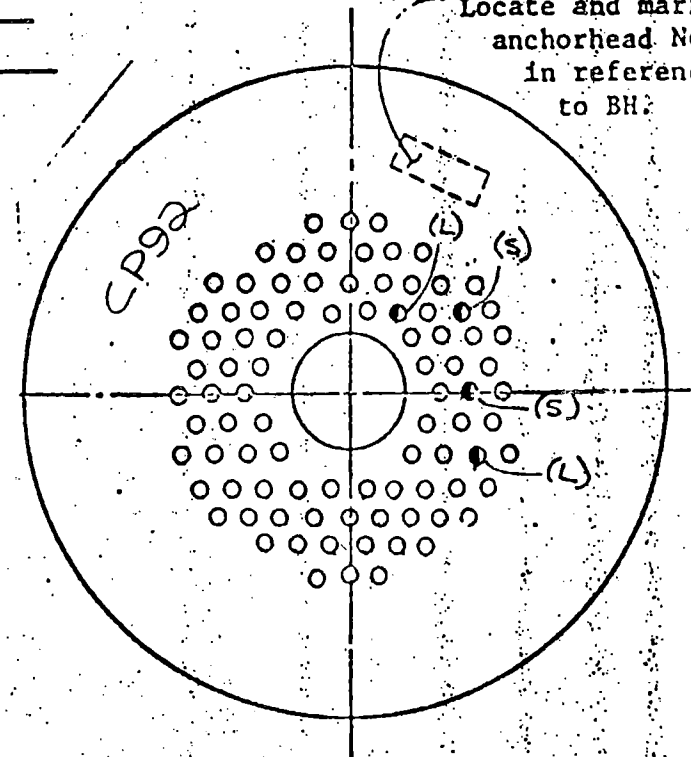
Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	N/A
Shims	GOOD
Bearing Plate	GOOD*
No. Off-Size BH	2-SMALL 2-LARGE
No. of Split BH	NONE

Corrosion Level

Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	1 *

* Surface covered by
grease esp only.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003''$
- #4 $.003'' < \text{pitting} \leq .006''$
- #5 $.006'' < \text{pitting} \leq .010''$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

FIVE YEAR TENDON SURVEILLANCE

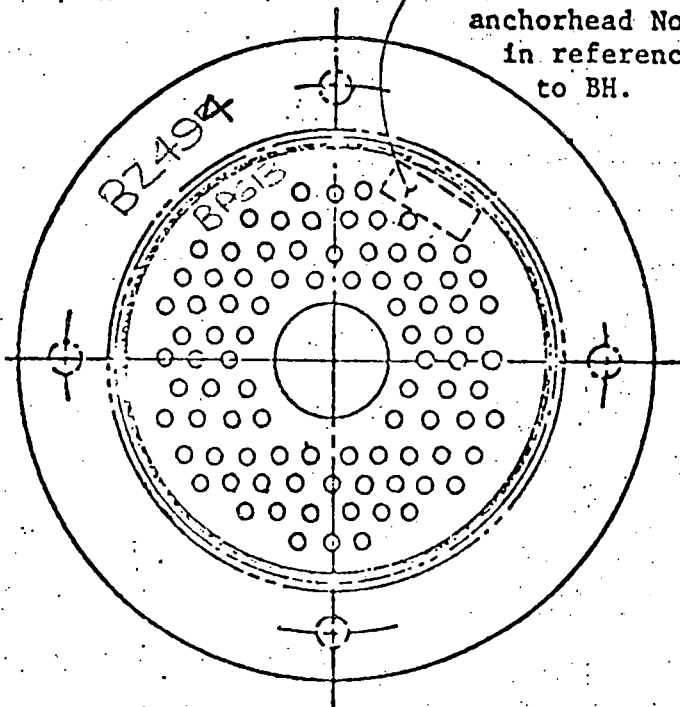
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 7GDF

Date: 11-5-75 By: H.S.G.

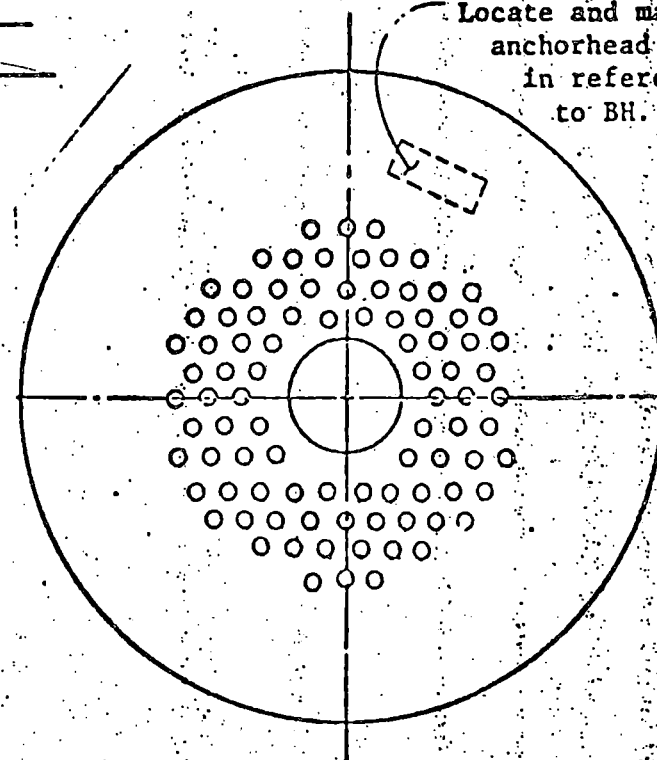
SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



FIELD END

Locate and mark
anchorhead
in reference
to BH.



Shop End	Field End
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Anchor Location	

Filler Coverage		
GOOD	Cap	
GOOD	Buttonheads	
GOOD	Anchor Head	
GOOD	Bushing	
GOOD	Shims	
GOOD*	Bearing Plate	
NONE	No. Off-Size BH	
NONE	No. of Split BH	

Corrosion Level		
1	Button Heads	
1	Anchor Head	
1	Bushing	
1	Shims	
1*	Bearing Plate	

* Surface covered by
grease cap only.

LEGEND FOR WIRE AND BUTTONHEADS

- ⊙ Wire removed previously.
- ⊘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- ⊙ Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

PACIFIC PLANT

FIVE YEAR TENDON SURVEILLANCE

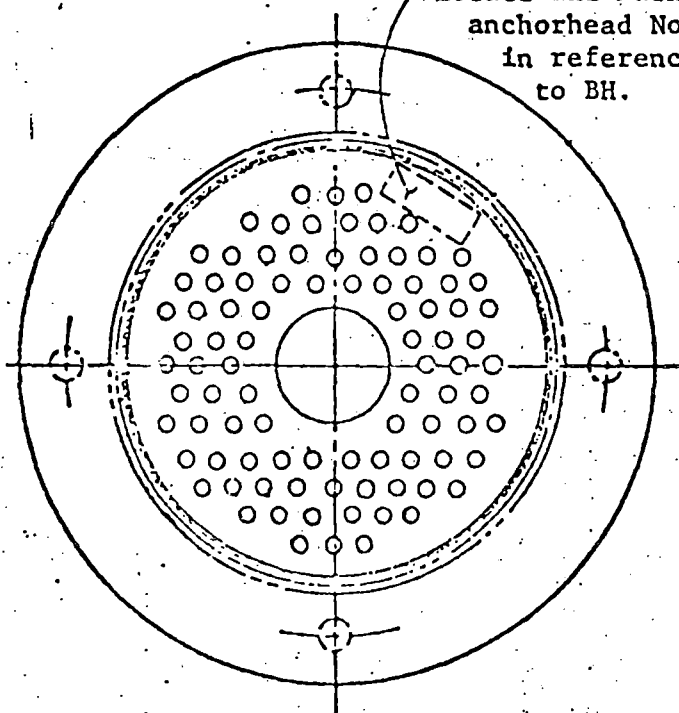
TENDON WIRE ANCHORAGE SKETCH

Tendon Identification 76DF

Date: 11-5-75 By: RTK

SHOP END

Locate and mark
anchorhead No.
in reference
to BH.



Shop End Field End

Anchor Location	
-----------------	--

Filler Coverage

Cap	GOOD
Buttonheads	GOOD
Anchor Head	GOOD
Bushing	N/A
Shims	GOOD
Bearing Plate	GOOD*
No. Off-Size BH	3-SMALL
No. of Split BH	NONE

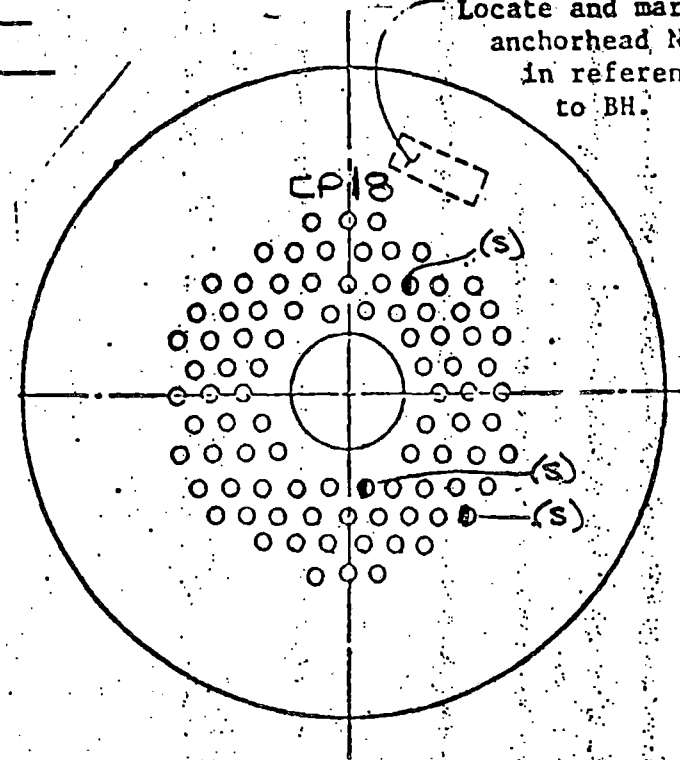
Corrosion Level

Button Heads	1
Anchor Head	1
Bushing	N/A
Shims	1
Bearing Plate	1*

* Surface covered by
grease exp only.

FIELD END

Locate and mark
anchorhead No.
in reference
to BH.



LEGEND FOR WIRE AND BUTTONHEADS

- Wire removed previously.
- ⌘ Discontinuous wire removed this surveillance.
- ⊗ Wire removed this surveillance for inspection.
- Off-size buttonhead.
- ⊙ Buttonhead with split.
- (L) Large buttonhead.
- (S) Small buttonhead.

LEGEND FOR CORROSION LEVEL

- #1 No visible oxidation
- #2 Visible oxidation, no pitting
- #3 $0 < \text{pitting} \leq .003"$
- #4 $.003" < \text{pitting} \leq .006"$
- #5 $.006" < \text{pitting} \leq .010"$

FIGURE C-3 TENDON WIRE ANCHORAGE SKETCH

APPENDIX D

Detensioning and Retensioning Force and Elongation Data.

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>V-36</u>	(2) LOCATION <u>TOP</u>	(3) DATE <u>9.29.75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°								
(9) CHECK GAGES (ZERO)	YES								
(10) MEASURE SHIMS (INCH)	13.6"								
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">(1) 4580 PSIG</td><td style="width: 40%; text-align: center;">686</td></tr> <tr> <td>(2) 4540 PSIG</td><td style="text-align: center;">680</td></tr> <tr> <td>(3) 4540 PSIG</td><td style="text-align: center;">680</td></tr> <tr> <td colspan="2">AVG. 4553 PSIG</td></tr> </table>	(1) 4580 PSIG	686	(2) 4540 PSIG	680	(3) 4540 PSIG	680	AVG. 4553 PSIG	
(1) 4580 PSIG	686								
(2) 4540 PSIG	680								
(3) 4540 PSIG	680								
AVG. 4553 PSIG									
4650/4580/4540/4540/	682 KIPS								
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000								
(12) DEPRESSURIZE TO ZERO	YES								
(13) REMOVE RAM	YES								
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO								
(15) CHECK CONTINUITY	90								

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

9.30.75

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90								
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	72°								
(19) CHECK GAGES (ZERO)	YES								
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600								
(21) MEASURE ELONGATION** (INCH)	2.9"								
(22) PRESSURIZE TO .8 _{pu} (5665 PSI)	5665								
(23) MEASURE ELONGATION AT .8 _{pu}	15.8"								
(24) SHIM TO NEW LIFT-OFF*	4553								
(25) DEPRESSURIZE TO ZERO	YES								
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">(1) 4520 PSIG</td><td style="width: 40%; text-align: center;">677</td></tr> <tr> <td>(2) 4500 PSIG</td><td style="text-align: center;">674</td></tr> <tr> <td>(3) 4550 PSIG</td><td style="text-align: center;">681</td></tr> <tr> <td colspan="2">AVG. 4523 PSIG</td></tr> </table>	(1) 4520 PSIG	677	(2) 4500 PSIG	674	(3) 4550 PSIG	681	AVG. 4523 PSIG	
(1) 4520 PSIG	677								
(2) 4500 PSIG	674								
(3) 4550 PSIG	681								
AVG. 4523 PSIG									
4420/4520/4500/4550/	677 KIPS								
(27) MEASURE NEW SHIMS (INCH)	14.5"								

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 105°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number V.36Calculation By H. GORAWSKICalculation Checked By Aty 19Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # N/A Gage # Ram Area in²Pressure = lb ÷ in² = psiPressure for .8 X Ultimate during retensioningPressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires RetensioningNo. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi

Field end:

Pressure = N/A psi X = psiPressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires RetensioningNo. Effective Wires Detensioning

Shop end:

Pressure = 4553 psi X 90 = 4553 psi

Field end:

Pressure = N/A psi X = psi4416
4689

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. V-86 (2) LOCATION TOP (3) DATE 10.1.75
(4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY H.S. GORAWSKI

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	13.6 "
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4550 PSIG 681
	(2) 4550 PSIG 681
	(3) 4540 PSIG 680
	AVG. 4546 PSIG 681 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	90

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	60°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (595 PSI)	595
(21) MEASURE ELONGATION** (INCH)	3.05 "
(22) PRESSURIZE TO .8 _{pu} (5603 PSI)	5603
(23) MEASURE ELONGATION AT .8 _{pu}	16.5 "
(24) SHIM TO NEW LIFT-OFF*	4500
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE 4635 4365	(1) 4440 PSIG 665
	(2) 4480 PSIG 671
	(3) 4450 PSIG 666
	AVG. 4456 PSIG 667 KIPS
(27) MEASURE NEW SHIMS (INCH)	14.5 "

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 106° F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number V-86Calculation By H.S. GORAWSKICalculation Checked By H. J. [unclear]Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # N/A Gage # N/A Ram Area in²Pressure = lb ÷ in² = psiPressure for .8 X Ultimate during retensioningPressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 89 = 5603 psi

Field end:

Pressure = N/A psi X 90 = psiPressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

 No. Effective Wires Retensioning No. Effective Wires Detensioning

Shop end:

Pressure = 4546 psi X 89 = 4500 psi

Field end:

Pressure = N/A psi X 90 = psi4365
4635

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>V-154</u>	(2) LOCATION <u>TOP</u>	(3) DATE <u>10.2.75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	59°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	12.6"
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4520 PSIG (2) 4560 PSIG (3) 4550 PSIG AVG. 4543 PSIG 682 KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES - 90

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (605 PSI)	605
(21) MEASURE ELONGATION** (INCH)	2.3"
(22) PRESSURIZE TO .8 _{pu} (566.5 PSI)	566.5
(23) MEASURE ELONGATION AT .8 _{pu}	14.8"
(24) SHIM TO NEW LIFT-OFF*	4543
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4600 PSIG (2) 4600 PSIG (3) 4610 PSIG AVG. 4603 PSIG 691 KIPS
(27) MEASURE NEW SHIMS (INCH)	14.2"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 107°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA



Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number V-154
Calculation By H.S. GORAWSKI
Calculation Checked By FC.

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # N/A Gage # — Ram Area — in²

Pressure = — lb ÷ — in² = — psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi

Field end:

Pressure = N/A psi X — = — psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4543 psi X 90 = 4543 psi

Field end:

Pressure = N/A psi X — = — psi

4407
4679

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>V-202</u>	(2) LOCATION <u>TOP</u>	(3) DATE <u>10.3.75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI

DESCRIPTION	ACTUAL MEASURED
(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	63°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	11.85"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4330 PSIG (2) 4340 PSIG (3) 4330 PSIG AVG. 4333 PSIG 649 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	610
(21) MEASURE ELONGATION** (INCH)	1.7"
(22) PRESSURIZE TO .8f _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	14.5"
(24) SHIM TO NEW LIFT-OFF*	4333
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4440 PSIG (2) 4400 PSIG (3) 4380 PSIG AVG. 4407 PSIG 660 KIPS
(27) MEASURE NEW SHIMS (INCH)	13.15"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 108°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number V-202
 Calculation By H.S. GORAWSKI
 Calculation Checked By FC

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # N/A Gage # Ram Area in²

Pressure = lb ÷ in² = psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi

Field end:

Pressure = N/A psi X = psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4333 psi X 90 = 4333 psi

Field end:

Pressure = psi X = psi

4203
4463

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>V-280</u>	(2) LOCATION <u>TOP</u>	(3) DATE <u>10.7.75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	69°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	13.4"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4460 PSIG (2) 4440 PSIG (3) 4500 PSIG AVG. 4467 PSIG
4580/4460/4440/4500/	671 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES 90

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	83°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.9"
(22) PRESSURIZE TO .8 _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{pu}	15.3"
(24) SHIM TO NEW LIFT-OFF*	4467
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4430 PSIG (2) 4390 PSIG (3) 4360 PSIG AVG. 4393 PSIG
4430/4390/4360/	661 KIPS
(27) MEASURE NEW SHIMS (INCH)	14.6"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 113°F
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number V-280Calculation By H.S. GORAWSKICalculation Checked By N/APressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # N/A Gage # N/A Ram Area N/A in²Pressure = N/A lb ÷ N/A in² = N/A psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi

Field end:

Pressure = N/A psi X N/A = N/A psiPressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4467 psi X 90 = 4467 psi 4330

Field end:

Pressure = N/A psi X N/A = N/A psi 4601

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

SHOP

(1) TENDON No. <u>D133</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>10-23-75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>89</u>

(Item #6, ref. attached notes)

DETENSIONING (9) RECORDED BY RTKRUPICKA

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	76°								
(9) CHECK GAGES (ZERO)	YES								
(10) MEASURE SHIMS (INCH)	5.3								
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">(1) 4280 PSIG</td><td style="width: 40%;"></td></tr> <tr> <td>(2) 4280 PSIG</td><td></td></tr> <tr> <td>(3) 4290 PSIG</td><td></td></tr> <tr> <td colspan="2">AVG. 4283 PSIG</td></tr> </table>	(1) 4280 PSIG		(2) 4280 PSIG		(3) 4290 PSIG		AVG. 4283 PSIG	
(1) 4280 PSIG									
(2) 4280 PSIG									
(3) 4290 PSIG									
AVG. 4283 PSIG									
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000								
(12) DEPRESSURIZE TO ZERO	YES								
(13) REMOVE RAM	YES								
(14) WAS INSPECTION WIRE CUT AT THIS END?	No								
(15) CHECK CONTINUITY	YES (89)								

RETENSIONING (16) RECORDED BY RTKRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89								
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°								
(19) CHECK GAGES (ZERO)	YES								
(20) PRESSURIZE TO 1000 LB/WIRE (594 PSI)	594								
(21) MEASURE ELONGATION** (INCH)	1.95								
(22) PRESSURIZE TO .8 _{f_{pu}} (5602 PSI)	5602								
(23) MEASURE ELONGATION AT .8 _{f_{pu}}	6.7								
(24) SHIM TO NEW LIFT-OFF*	4283								
(25) DEPRESSURIZE TO ZERO	YES								
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">(1) 4410 PSIG</td><td style="width: 40%;"></td></tr> <tr> <td>(2) 4410 PSIG</td><td></td></tr> <tr> <td>(3) 4390 PSIG</td><td></td></tr> <tr> <td colspan="2">AVG. 4403 PSIG</td></tr> </table>	(1) 4410 PSIG		(2) 4410 PSIG		(3) 4390 PSIG		AVG. 4403 PSIG	
(1) 4410 PSIG									
(2) 4410 PSIG									
(3) 4390 PSIG									
AVG. 4403 PSIG									
(27) MEASURE NEW SHIMS (INCH)	5.8"								

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 110°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

~~SHAD FIELD~~

(1) TENDON No. <u>D1-33</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>10-27-75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>89</u>

(Item # 6, ref. attached notes)

DETENSIONING (9) RECORDED BY R.T. KRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	49°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.3
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4500 PSIG
	(2) 4480 PSIG
	(3) 4470 PSIG
	AVG. 4483 PSIG 671 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (89)

RETENSIONING (16) RECORDED BY R.T. KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	49°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (594 PSI)	594
(21) MEASURE ELONGATION** (INCH)	2.25
(22) PRESSURIZE TO .8f _{pu} (5602 PSI)	5602
(23) MEASURE ELONGATION AT .8f _{pu}	6.9
(24) SHIM TO NEW LIFT-OFF*	4483
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4360 PSIG
	(2) 4420 PSIG
	(3) 4400 PSIG
	AVG. 4393 PSIG 658 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.15

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 105°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number D1-33Calculation By R.T. KRUPICKACalculation Checked By R. BlumPressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 89 = 838,850 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²Pressure = 838,850 lb ÷ 149.730 in² = 5602 psiField end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 838,850 lb ÷ 149.730 in² = 5602 psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5602 psi X 89 = 5602 psi
89

Field end:

Pressure = 5602 psi X 89 = 5602 psi
89Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4483 psi X 89 = 4483 psi 4617
89 4349

Field end:

Pressure = 4283 psi X 89/89 = 4283 psi 4411
4155

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



October 23, 1975

DOME TENDON D1-33.

Removal and inspection of discontinuous wire:
(Figure C-2, item #6)

One wire with buttonhead missing at field end of dome tendon D1-33 was found and removed.

Original installation records indicate that 1" of wire with undersize buttonhead was cut off on 2. 26. 1969.

Inspection of wire revealed presence of shear cut mark at the free end of this wire.

Therefore it ~~is~~ is concluded, that a new buttonhead was not formed, and that tendon D1*33 was tensioned with 89 effective wires.

Henry S. Gorawski
Henry S. Gorawski

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>DL-51</u>	(2) LOCATION <u>SHOP</u>	(3) DATE <u>10-28-75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY R.T. KRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	66°								
(9) CHECK GAGES (ZERO)	YES								
(10) MEASURE SHIMS (INCH)	4.5								
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 60%;">(1) 4420 PSIG</td><td style="width: 40%;"></td></tr> <tr><td>(2) 4400 PSIG</td><td></td></tr> <tr><td>(3) 4420 PSIG</td><td></td></tr> <tr><td>AVG. 4413 PSIG</td><td>661 KIPS</td></tr> </table>	(1) 4420 PSIG		(2) 4400 PSIG		(3) 4420 PSIG		AVG. 4413 PSIG	661 KIPS
(1) 4420 PSIG									
(2) 4400 PSIG									
(3) 4420 PSIG									
AVG. 4413 PSIG	661 KIPS								
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000								
(12) DEPRESSURIZE TO ZERO	YES								
(13) REMOVE RAM	YES								
(14) WAS INSPECTION WIRE CUT AT THIS END?	No								
(15) CHECK CONTINUITY	YES (90)								

RETENSIONING (16) RECORDED BY R.T. KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90								
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°								
(19) CHECK GAGES (ZERO)	YES								
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603								
(21) MEASURE ELONGATION** (INCH)	1.4								
(22) PRESSURIZE TO .8 _{pu} (566 PSI)	566								
(23) MEASURE ELONGATION AT .8 _{pu}	5.7								
(24) SHIM TO NEW LIFT-OFF*	4413								
(25) DEPRESSURIZE TO ZERO	YES								
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 60%;">(1) 4540 PSIG</td><td style="width: 40%;"></td></tr> <tr><td>(2) 4530 PSIG</td><td></td></tr> <tr><td>(3) 4540 PSIG</td><td></td></tr> <tr><td>AVG. 4537 PSIG</td><td>679 KIPS</td></tr> </table>	(1) 4540 PSIG		(2) 4530 PSIG		(3) 4540 PSIG		AVG. 4537 PSIG	679 KIPS
(1) 4540 PSIG									
(2) 4530 PSIG									
(3) 4540 PSIG									
AVG. 4537 PSIG	679 KIPS								
(27) MEASURE NEW SHIMS (INCH)	4.8								

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 104°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. D1-51 (2) LOCATION FIELD (3) DATE 10-28-75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY R.T. KRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	54°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	4.55
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4640 PSIG (2) 4580 PSIG (3) 4560 PSIG AVG. 4593 PSIG 688 KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY R.T. KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	56°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	1.7
(22) PRESSURIZE TO $.8f_{pu}$ (5665 PSI)	5665
(23) MEASURE ELONGATION AT $.8f_{pu}$	5.45
(24) SHIM TO NEW LIFT-OFF*	4593
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4540 PSIG (2) 4540 PSIG (3) 4550 PSIG AVG. 4543 PSIG 680 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.15

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD,

CONTAINMENT INTERIOR AIR TEMP. 104°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number DI-51Calculation By RT KRUPICKACalculation Checked By R BlumPressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # 9178 Gage # 2 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi
90

Field end:

Pressure = 5665 psi X 90 = 5665 psi
90Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4413 psi X 90 = 4413 psi
90

Field end:

Pressure = 4593 psi X 90/90 = 4593 psi
4545
4281
4731
4455

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. D2-21 (2) LOCATION SHOP (3) DATE 10-22-75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY R.T. KRUPICKA

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	63°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	4.8
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4420 PSIG (2) 4500 PSIG (3) 4460 PSIG AVG. 4460 PSIG
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY R.T. KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	1.9
(22) PRESSURIZE TO .8 _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{pu}	7.25
(24) SHIM TO NEW LIFT-OFF*	4460
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4480 PSIG (2) 4480 PSIG (3) 4440 PSIG AVG. 4467 PSIG
(27) MEASURE NEW SHIMS (INCH)	6.3

* NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

** ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 108°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>D2-21</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>10-22-75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY R.T. KRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.0
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4300 PSIG
	(2) 4320 PSIG
	(3) 4320 PSIG
	AVG. 4313 PSIG 646 KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY R.T. KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	1.65
(22) PRESSURIZE TO .8 _{pu} (566 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{pu}	6.3
(24) SHIM TO NEW LIFT-OFF*	4313
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4290 PSIG
	(2) 4225 PSIG
	(3) 4250 PSIG
	AVG. 4258 PSIG 638 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.7

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 108°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number D2-21Calculation By R.T. KRUPICKACalculation Checked By R BlumPressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi
90

Field end:

Pressure = 5665 psi X 90 = 5665 psi
90Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4460 psi X 90 = 4460 psi 4595
90 4330

Field end:

Pressure = 4315 psi X 90 = 4315 psi 4445
90 4185

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. D2-49 (2) LOCATION SHOP (3) DATE 10-21-75
(4) JACK No. 5178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY RT KRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	4.7
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4300 PSIG (2) 4240 PSIG (3) 4260 PSIG AVG. 4267 PSIG 639 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY RT KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	2.0
(22) PRESSURIZE TO .8 _{f_{pu}} (566 PSI)	566
(23) MEASURE ELONGATION AT .8 _{f_{pu}}	6.0
(24) SHIM TO NEW LIFT-OFF*	4267
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4400 PSIG (2) 4330 PSIG (3) 4330 PSIG AVG. 4387 PSIG 657 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.1

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 110°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>22-49</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>10-20-75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY RT KRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	4.45
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4280 PSIG
	(2) 4280 PSIG
	(3) 4280 PSIG
	AVG. 4280 PSIG <u>541</u> KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY RT KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	1.55
(22) PRESSURIZE TO .8f _{pu} (5645 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	6.25
(24) SHIM TO NEW LIFT-OFF*	4280
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4280 PSIG
	(2) 4280 PSIG
	(3) 4280 PSIG
	AVG. 4280 PSIG <u>631</u> KIPS
(27) MEASURE NEW SHIMS (INCH)	5.25

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 109°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number D2-49

Calculation By R.T. KRUPKA

Calculation Checked By R. Blum

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi

Field end:

Pressure = 5665 psi X 90 = 5665 psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4270 psi X 90 = 4270 psi $\frac{4400}{4140}$

Field end:

Pressure = 4280 psi X 90% = 4280 psi $\frac{4410}{4150}$

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. D3-40 (2) LOCATION SHOP (3) DATE 10-16-75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY R.T.K.
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.15
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4480 PSIG (2) 4500 PSIG (3) 4440 PSIG AVG. 4473 PSIG
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY F.B.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	49°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	1.7
(22) PRESSURIZE TO .8 _{fu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{fu}	6.55
(24) SHIM TO NEW LIFT-OFF*	4473
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4420 PSIG (2) 4410 PSIG (3) 4420 PSIG AVG. 4417 PSIG
(27) MEASURE NEW SHIMS (INCH)	5.65

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 113°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>D3-40</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>10-16-75</u>
(4) JACK No. <u>9135</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	69°								
(9) CHECK GAGES (ZERO)	YES								
(10) MEASURE SHIMS (INCH)	5.05								
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">(1) 4410 PSIG</td><td style="width: 30%;"></td></tr> <tr> <td>(2) 4400 PSIG</td><td></td></tr> <tr> <td>(3) 4460 PSIG</td><td></td></tr> <tr> <td>AVG. 4423 PSIG</td><td>662 KIPS</td></tr> </table>	(1) 4410 PSIG		(2) 4400 PSIG		(3) 4460 PSIG		AVG. 4423 PSIG	662 KIPS
(1) 4410 PSIG									
(2) 4400 PSIG									
(3) 4460 PSIG									
AVG. 4423 PSIG	662 KIPS								
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000								
(12) DEPRESSURIZE TO ZERO	YES								
(13) REMOVE RAM	YES								
(14) WAS INSPECTION WIRE CUT AT THIS END?	No								
(15) CHECK CONTINUITY	YES (90)								

RETENSIONING (16) RECORDED BY R.T.K.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90								
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	56°								
(19) CHECK GAGES (ZERO)	YES								
(20) PRESSURIZE TO 1000 LB/WIRE (603PSI)	603								
(21) MEASURE ELONGATION** (INCH)	2.25								
(22) PRESSURIZE TO .8 _{fu} (5665PSI)	5665								
(23) MEASURE ELONGATION AT .8 _{fu}	7.15								
(24) SHIM TO NEW LIFT-OFF*	4423								
(25) DEPRESSURIZE TO ZERO	YES								
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">(1) 4400 PSIG</td><td style="width: 30%;"></td></tr> <tr> <td>(2) 4440 PSIG</td><td></td></tr> <tr> <td>(3) 4420 PSIG</td><td></td></tr> <tr> <td>AVG. 4420 PSIG</td><td>662 KIPS</td></tr> </table>	(1) 4400 PSIG		(2) 4440 PSIG		(3) 4420 PSIG		AVG. 4420 PSIG	662 KIPS
(1) 4400 PSIG									
(2) 4440 PSIG									
(3) 4420 PSIG									
AVG. 4420 PSIG	662 KIPS								
(27) MEASURE NEW SHIMS (INCH)	6.10								

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 113°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA



Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number D3-40

Calculation By R.T. KRUPICKA

Calculation Checked By R Blum

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi
90

Field end:

Pressure = 5665 psi X 90 = 5665 psi
90

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4473 psi X 90 = 4473 psi 4600
90 4340

Field end:

Pressure = 4423 psi X 90 = 4423 psi 4560
90 4290

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. D3-49 (2) LOCATION SHOP END (3) DATE 10.14.75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY F. B.
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	75°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	4.15"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4400 PSIG (2) 4400 PSIG (3) 4380 PSIG AVG. 4393 PSIG 658 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY R. T. K.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	70°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (595 PSI)	595
(21) MEASURE ELONGATION** (INCH)	1.25"
(22) PRESSURIZE TO .8f _{pu} (5605 PSI)	5605
(23) MEASURE ELONGATION AT .8f _{pu}	6.0"
(24) SHIM TO NEW LIFT-OFF*	4344
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4380 PSIG (2) 4350 PSIG (3) 4380 PSIG AVG. 4370 PSIG 654 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.0"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 115°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE

(1) TENDON No. <u>D3-49</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>10.14.75</u>
(4) JACK No. <u>4185</u>	(5) GAGE No. <u>— 1 —</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H. S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	4.95"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4440 PSIG
	(2) 4440 PSIG
	(3) 4450 PSIG
	AVG. 4443 PSIG 665 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	YES
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H. S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	69°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (595 PSI)	595
(21) MEASURE ELONGATION** (INCH)	1.75
(22) PRESSURIZE TO .8 f_{pu} (5605 PSI)	5605
(23) MEASURE ELONGATION AT .8 f_{pu}	5.25"
(24) SHIM TO NEW LIFT-OFF*	4394
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4500 PSIG
	(2) 4540 PSIG
	(3) 4520 PSIG
	AVG. 4520 PSIG 677 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.0"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

x CONTAINMENT INTERIOR AIR TEMP. 115°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number D3-49Calculation By H.S. GORAWSKICalculation Checked By R BlumPressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9187 Gage # 2 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 89 = 5603 psi

Field end:

Pressure = 5665 psi X 89 = 5603 psiPressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4393 psi X 89 = 4344 psi

Field end:

Pressure = 4344 psi X 89 = 4394 psi4474
42144527
4263

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>49 EA</u>	(2) LOCATION <u>SHOP</u>	(3) DATE <u>12.2.75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	32°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.35"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4480 PSIG
	(2) 4440 PSIG
	(3) 4430 PSIG
	AVG. 4450 PSIG 666 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	34°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.55"
(22) PRESSURIZE TO .8 _{pu} (566 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{pu}	7.7"
(24) SHIM TO NEW LIFT-OFF*	4450
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4570 PSIG
	(2) 4580 PSIG
	(3) 4570 PSIG
	AVG. 4573 PSIG 685 KIPS
(27) MEASURE NEW SHIMS (INCH)	7.0"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 92°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 49EA (2) LOCATION FIELD (3) DATE 12.2.75
 (4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
 DETENSIONING 90

DETENSIONING (9) RECORDED BY D. WAITKUS
 DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	52°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.3"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4500 PSIG (2) 4500 PSIG (3) 4480 PSIG AVG. 4493 PSIG 673 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY L. G.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	55°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.75"
(22) PRESSURIZE TO .8f _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	7.85"
(24) SHIM TO NEW LIFT-OFF*	4493
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4500 PSIG (2) 4500 PSIG (3) 4490 PSIG AVG. 4497 PSIG 673 KIPS
(27) MEASURE NEW SHIMS (INCH)	7.2"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
 LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
 TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 92°F
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 49 EA
 Calculation By H. S. GORAWSKI
 Calculation Checked By RBL

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X $\frac{\text{No. Effective Wires Retensioning}}{\text{No. Effective Wires Detensioning}}$

Shop end:

Pressure = 5665 psi X $\frac{90}{90}$ = 5665 psi

Field end:

Pressure = 5665 psi X $\frac{90}{90}$ = 5665 psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

$\frac{\text{No. Effective Wires Retensioning}}{\text{No. Effective Wires Detensioning}}$

Shop end:

Pressure = 4450 psi X $\frac{90}{90}$ = 4450 psi

Field end:

Pressure = 4493 psi X $\frac{90}{90}$ = 4493 psi

4585

4315

4628

4358

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>59 BD</u>	(2) LOCATION <u>SHOP</u>	(3) DATE <u>11.17.75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>87</u>

DETENSIONING (9) RECORDED BY Woody

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	50°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	7.35"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4300 PSIG
	(2) 4320 PSIG
	(3) 4240 PSIG
	AVG. 4287 PSIG 640 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY Woody

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	87
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	60°
(19) CHECK GAGES (ZERO)	YES
(20) PRESTURIZE TO 1000 LB/WIRE (580 PSI)	580
(21) MEASURE ELONGATION** (INCH)	4.0"
(22) PRESTURIZE TO .8 _{pu} (5480 PSI)	5480
(23) MEASURE ELONGATION AT .8 _{pu}	9.2"
(24) SHIM TO NEW LIFT-OFF*	4287
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4390 PSIG
	(2) 4380 PSIG
	(3) 4360 PSIG
	AVG. 4377 PSIG 655 KIPS
(27) MEASURE NEW SHIMS (INCH)	8.55"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 100°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>59 BD</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>11.17.75</u>	
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>87</u>	

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	68°								
(9) CHECK GAGES (ZERO)	YES								
(10) MEASURE SHIMS (INCH)	7.8"								
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td style="width:50%;">(1) 4300 PSIG</td><td style="width:50%;"></td></tr> <tr><td>(2) 4290 PSIG</td><td></td></tr> <tr><td>(3) 4280 PSIG</td><td></td></tr> <tr><td>AVG. 4290 PSIG</td><td>644 KIPS</td></tr> </table>	(1) 4300 PSIG		(2) 4290 PSIG		(3) 4280 PSIG		AVG. 4290 PSIG	644 KIPS
(1) 4300 PSIG									
(2) 4290 PSIG									
(3) 4280 PSIG									
AVG. 4290 PSIG	644 KIPS								
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000								
(12) DEPRESSURIZE TO ZERO	YES								
(13) REMOVE RAM	YES								
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO								
(15) CHECK CONTINUITY	YES (90)								

RETENSIONING (15) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	87								
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	72°								
(19) CHECK GAGES (ZERO)	YES								
(20) PRESTURIZE TO 1000 LB/WIRE (580 PSI)	580								
(21) MEASURE ELONGATION** (INCH)	4.2"								
(22) PRESTURIZE TO .8 _f _{pu} (5480 PSI)	5480								
(23) MEASURE ELONGATION AT .8 _f _{pu}	9.55"								
(24) SHIM TO NEW LIFT-OFF*	4290								
(25) DEPRESSURIZE TO ZERO	YES								
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td style="width:50%;">(1) 4410 PSIG</td><td style="width:50%;"></td></tr> <tr><td>(2) 4410 PSIG</td><td></td></tr> <tr><td>(3) 4440 PSIG</td><td></td></tr> <tr><td>AVG. 4420 PSIG</td><td>664 KIPS</td></tr> </table>	(1) 4410 PSIG		(2) 4410 PSIG		(3) 4440 PSIG		AVG. 4420 PSIG	664 KIPS
(1) 4410 PSIG									
(2) 4410 PSIG									
(3) 4440 PSIG									
AVG. 4420 PSIG	664 KIPS								
(27) MEASURE NEW SHIMS (INCH)	8.85"								

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 100°F.

FIGURE C-2. DETENSIONING & RETENSIONING DATA

Post Tensioning Division

November 19, 1975

HOOP TENDON # 59 BD.

BROKEN WIRE INSPECTION:

Prior to detensioning hoop tendon #59 BD, three broken wires were identified at field end.

After detensioning and continuity check these discontinuous wires were removed from the tendon. Each of the removed wires were visually inspected.

Two of the wires broke in an area just below the button head, where there is evidence of severe damage to the wire from button heading equipment during original installation. The third wire broke approx. 4' from the field anchor head. Samples from each end of break will be submitted for laboratory testing.

Lift-off force measured during detensioning:

Field end: 644 kips

Shop end: 640 kips

Lift-off force measured during final retensioning:

Field end: 664 kips

Shop end: 655 kips


Henry S. Gorawski

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 59 BD
 Calculation By H.S. GORAWSKI
 Calculation Checked By FC.

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 87 = 820,000 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 820,000 lb ÷ 149.730 in² = 5480 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 820,000 lb ÷ 149.730 in² = 5480 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5480 psi X 87 = 5480 psi

Field end:

Pressure = 5480 psi X 87 = 5480 psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4287 psi X 87/87 = 4287 psi $\frac{4416}{4158}$

Field end:

Pressure = 4290 psi X 87/87 = 4290 psi $\frac{4420}{4160}$

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>6330</u>	(2) LOCATION <u>SHOP</u>	(3) DATE <u>11.18.75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY L. G.
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	56°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.55"
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4600 PSIG
	(2) 4700 PSIG
	(3) 4690 PSIG
	AVG. 4663 PSIG 698 KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY L. G.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	71°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.45"
(22) PRESSURIZE TO .8f _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	6.6"
(24) SHIM TO NEW LIFT-OFF*	4663
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4720 PSIG
	(2) 4700 PSIG
	(3) 4710 PSIG
	AVG. 4710 PSIG 705 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.975"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 99°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 63 BD (2) LOCATION FIELD (3) DATE 11.18.75
 (4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
 DETENSIONING 90

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
 DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	73°	
(9) CHECK GAGES (ZERO)	YES	
(10) MEASURE SHIMS (INCH)	5.3"	
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4520 PSIG	
	(2) 4500 PSIG	
	(3) 4500 PSIG	
	AVG. 4507 PSIG	677 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000	
(12) DEPRESSURIZE TO ZERO	YES	
(13) REMOVE RAM	YES	
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO	
(15) CHECK CONTINUITY	YES (90)	

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90	
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	76°	
(19) CHECK GAGES (ZERO)	YES	
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	600	
(21) MEASURE ELONGATION** (INCH)	0.9"	
(22) PRESSURIZE TO .8 _{pu} (566 PSI)	566.5	
(23) MEASURE ELONGATION AT .8 _{pu}	6.7"	
(24) SHIM TO NEW LIFT-OFF*	45.07	
(25) DEPRESSURIZE TO ZERO	YES	
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4460 PSIG	
	(2) 4440 PSIG	
	(3) 4440 PSIG	
	AVG. 4447 PSIG	668 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.9"	

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
 LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
 TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 99°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 63 BD
 Calculation By H.S. GORAWSKI
 Calculation Checked By FC.

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # #2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi
90

Field end:

Pressure = 5665 psi X 90 = 5665 psi
90

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4663 psi X 90/90 = 4663 psi 4802
4523

Field end:

Pressure = 4507 psi X 90/90 = 4507 psi 4640
4370

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>808D</u>	(2) LOCATION <u>SHOP</u>	(3) DATE <u>11.19.75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>#2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	58°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.4"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4220 PSIG
	(2) 4140 PSIG
	(3) 4140 PSIG
	AVG. 4167 PSIG 622 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (15) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	60°
(19) CHECK GAGES (ZERO)	YES
(20) PRESURIZE TO 1070 LB/WIRE (603 PSI)	600
(21) MEASURE ELONGATION** (INCH)	1.8"
(22) PRESURIZE TO .8f _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	6.9"
(24) SHIM TO NEW LIFT-OFF*	4167
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4300 PSIG
	(2) 4280 PSIG
	(3) 4300 PSIG
	AVG. 4293 PSIG 641 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.05

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 99°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>80BD</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>11.19.75</u>
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY F. COCHRANE
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	64°								
(9) CHECK GAGES (ZERO)	YES								
(10) MEASURE SHIMS (INCH)	5.55"								
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:60%;">(1) 4380 PSIG</td><td style="width:40%;"></td></tr> <tr> <td>(2) 4340 PSIG</td><td></td></tr> <tr> <td>(3) 4340 PSIG</td><td></td></tr> <tr> <td>AVG. 4353 PSIG</td><td>654 KIPS</td></tr> </table>	(1) 4380 PSIG		(2) 4340 PSIG		(3) 4340 PSIG		AVG. 4353 PSIG	654 KIPS
(1) 4380 PSIG									
(2) 4340 PSIG									
(3) 4340 PSIG									
AVG. 4353 PSIG	654 KIPS								
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000								
(12) DEPRESSURIZE TO ZERO	YES								
(13) REMOVE RAM	YES								
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO								
(15) CHECK CONTINUITY	YES (90)								

RETENSIONING (16) RECORDED BY F. COCHRANE

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90								
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	73°								
(19) CHECK GAGES (ZERO)	YES								
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	600								
(21) MEASURE ELONGATION** (INCH)	1.95"								
(22) PRESSURIZE TO .8F _{pu} (5665 PSI)	5665								
(23) MEASURE ELONGATION AT .8F _{pu}	6.8"								
(24) SHIM TO NEW LIFT-OFF*	4353								
(25) DEPRESSURIZE TO ZERO	YES								
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:60%;">(1) 4440 PSIG</td><td style="width:40%;"></td></tr> <tr> <td>(2) 4420 PSIG</td><td></td></tr> <tr> <td>(3) 4420 PSIG</td><td></td></tr> <tr> <td>AVG. 4427 PSIG</td><td>665 KIPS</td></tr> </table>	(1) 4440 PSIG		(2) 4420 PSIG		(3) 4420 PSIG		AVG. 4427 PSIG	665 KIPS
(1) 4440 PSIG									
(2) 4420 PSIG									
(3) 4420 PSIG									
AVG. 4427 PSIG	665 KIPS								
(27) MEASURE NEW SHIMS (INCH)	6.05"								

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 99°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 80 BD

Calculation By H.S. GORAWSKI

Calculation Checked By _____

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # #2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # #1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi
90

Field end:

Pressure = 5665 psi X 90 = 5665 psi
90

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4167 psi X 90/90 = 4167 psi 4292
4042

Field end:

Pressure = 4353 psi X 90/90 = 4353 psi 4483
4222

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 66 BF (2) LOCATION SHOP (3) DATE 11.24.75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY H.S. GORAWSKI

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	44°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.8"
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4620 PSIG
	(2) 4530 PSIG
	(3) 4590 PSIG
	AVG. 4580 PSIG 684 KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	38°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.4"
(22) PRESSURIZE TO .8f _{pu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	7.25"
(24) SHIM TO NEW LIFT-OFF*	4580
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4500 PSIG
	(2) 4480 PSIG
	(3) 4510 PSIG
	AVG. 4497 PSIG 673 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.55"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 98°F
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 66 BF (2) LOCATION FIELD (3) DATE 11.24.75
 (4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
 DETENSIONING 90

DETENSIONING (9) RECORDED BY L. G.

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	58°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.0"
(11a) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4380 PSIG (2) 4360 PSIG (3) 4360 PSIG AVG. 4367 PSIG 654 KIPS
(11b) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (15) RECORDED BY L. G.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	53°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	1.85"
(22) PRESSURIZE TO .8f _{pu} (PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	7.3"
(24) SHIM TO NEW LIFT-OFF*	4367
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4480 PSIG (2) 4485 PSIG (3) 4460 PSIG AVG. 4475 PSIG 672 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.6"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
 LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
 TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 98°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 66 BF

Calculation By H.S. GORAWSKI

Calculation Checked By R Blum

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90/90 = 5665 psi

Field end:

Pressure = 5665 psi X 90/90 = 5665 psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4580 psi X 90/90 = 4580 psi

Field end:

Pressure = 4367 psi X 90/90 = 4367 psi

4717

4442

4498

4236

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 71 BF (2) LOCATION SHOP (3) DATE 11.25.75
 (4) JACK No. 9178 (5) GAGE No. 52 (6) NO. EFF. WIRES AT
 DETENSIONING 90

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
 DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	42°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.8"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4570 PSIG (2) 4550 PSIG (3) 4560 PSIG AVG. 4560 PSIG 683 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	34°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.25"
(22) PRESSURIZE TO .8 _{f_{pu}} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{f_{pu}}	7.45"
(24) SHIM TO NEW LIFT-OFF*	4560
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4640 PSIG (2) 4610 PSIG (3) 4580 PSIG AVG. 4610 PSIG 690 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.75"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
 LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
 TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 95°F
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>71 BF</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>11.25.75</u>	
(4) JACK No. <u>9185</u>	(5) GAGE No. <u>1</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>	

DETENSIONING (9) RECORDED BY L. G.

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	48°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.35"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4380 PSIG
	(2) 4380 PSIG
	(3) 4380 PSIG
	AVG. 4380 PSIG 656 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY L. G.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	43°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.65"
(22) PRESSURIZE TO .8 _{pu} (566.5 PSI)	566.5
(23) MEASURE ELONGATION AT .8 _{pu}	7.8"
(24) SHIM TO NEW LIFT-OFF*	4380
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4415 PSIG
	(2) 4410 PSIG
	(3) 4415 PSIG
	AVG. 4413 PSIG 661 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.9"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 95°F

FIGURE C-2 DETENSIONING & RETENSIONING DATA



Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 71BF

Calculation By H.S. GORAWSKI

Calculation Checked By R Blum

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi
90

Field end:

Pressure = 5665 psi X 90 = 5665 psi
90

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4560 psi X 90/90 = 4560 psi

Field end:

Pressure = 4380 psi X 90/90 = 4380 psi

4696
4425
4511
4250

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 79 BF (2) LOCATION SHOP (3) DATE 11.26.75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 89

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	32°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.5"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4420 PSIG (2) 4410 PSIG (3) 4470 PSIG AVG. 4433 PSIG
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	39°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1070 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.4"
(22) PRESSURIZE TO .8 _{fu} (5603 PSI)	5600
(23) MEASURE ELONGATION AT .8 _{fu}	7.75"
(24) SHIM TO NEW LIFT-OFF*	4433
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4530 PSIG (2) 4530 PSIG (3) 4520 PSIG AVG. 4527 PSIG
(27) MEASURE NEW SHIMS (INCH)	6.95"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 96°F
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 79BF (2) LOCATION FIELD (3) DATE 11.26.75
 (4) JACK No. 9185 (5) GAGE No. 1 (6) NO. EFF. WIRES AT
 DETENSIONING 89

DETENSIONING (9) RECORDED BY L.G.
 DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	40°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.35"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4380 PSIG (2) 4380 PSIG (3) 4440 PSIG AVG. 4400 PSIG 659 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	NO
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY L.G.

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	50°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (600 PSI)	600
(21) MEASURE ELONGATION** (INCH)	2.25"
(22) PRESSURIZE TO .8 _{f_{pu}} (5603 PSI)	5600
(23) MEASURE ELONGATION AT .8 _{f_{pu}}	7.4"
(24) SHIM TO NEW LIFT-OFF*	4400
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4470 PSIG (2) 4430 PSIG (3) 4490 PSIG AVG. 4463 PSIG 668 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.7"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
 LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
 TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP 96°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 26, 1975

HOOP TENDON 79 B-F.

Inspection of discontinuous wire.

Prior to detensioning tendon 79 B-F one discontinuous wire was found at field end.

Inspection of button heads with GO-NO-GO gage disclosed seven(7) undersize button heads.

Inspection of removed wire disclosed one very small button head at field end that pulled through the field head during tensioning.

H.S.G.
Henry S. Gorawski

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 79 BF
 Calculation By H.S. GORAWSKI
 Calculation Checked By R Blum

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

$$\text{Force} = .8 \times 240,000 \times .04909 \times \underline{89} = \underline{838,850 \text{ lb}}$$

Pressure = Force \div Ram area

Shop end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

$$\text{Pressure} = \underline{838,850 \text{ lb}} \div \underline{149.730 \text{ in}^2} = \underline{5603 \text{ psi}}$$

Field end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

$$\text{Pressure} = \underline{838,850 \text{ lb}} \div \underline{149.730 \text{ in}^2} = \underline{5603 \text{ psi}}$$

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

$$\text{Pressure} = \underline{5603 \text{ psi}} \times \frac{\underline{89}}{\underline{89}} = \underline{5603 \text{ psi}}$$

Field end:

$$\text{Pressure} = \underline{5603 \text{ psi}} \times \frac{\underline{89}}{\underline{89}} = \underline{5603 \text{ psi}}$$

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

$$\text{Pressure} = \underline{4433 \text{ psi}} \times \frac{\underline{89/89}}{\underline{89/89}} = \underline{4433 \text{ psi}} \quad \begin{array}{l} 4566 \\ 4300 \end{array}$$

Field end:

$$\text{Pressure} = \underline{4400 \text{ psi}} \times \frac{\underline{89/89}}{\underline{89/89}} = \underline{4400 \text{ psi}} \quad \begin{array}{l} 4532 \\ 4270 \end{array}$$

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 56DF (2) LOCATION SHOP (3) DATE 10-30-75
 (4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
 DETENSIONING 90

DETENSIONING (9) RECORDED BY RTK
 DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	7.6"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4560 PSIG
	(2) 4570 PSIG
	(3) 4500 PSIG
	AVG. 4543 PSIG 680 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY RTK

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	67°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (594 PSI)	594
(21) MEASURE ELONGATION** (INCH)	3.7
(22) PRESSURIZE TO $.8f_{pu}$ (560 PSI)	5602
(23) MEASURE ELONGATION AT $.8f_{pu}$	8.8
(24) SHIM TO NEW LIFT-OFF*	4493
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4370 PSIG
	(2) 4380 PSIG
	(3) 4370 PSIG
	AVG. 4373 PSIG 655 KIPS
(27) MEASURE NEW SHIMS (INCH)	8.2

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
 LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
 TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 102°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 56DF (2) LOCATION FIELD (3) DATE 10-30-75
(4) JACK No. 9178 (5) GAGE No. 2 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY RTK
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	51°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	7.1
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4480 PSIG (2) 4460 PSIG (3) 4460 PSIG AVG. 4467 PSIG 669 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	YES
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (15) RECORDED BY RTK

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	89
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	57°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (594 PSI)	594
(21) MEASURE ELONGATION** (INCH)	3.55
(22) PRESSURIZE TO $.8f_{pu}$ (5602 PSI)	5602
(23) MEASURE ELONGATION AT $.8f_{pu}$	8.8
(24) SHIM TO NEW LIFT-OFF*	4.17
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4330 PSIG (2) 4440 PSIG (3) 4420 PSIG AVG. 4413 PSIG 661 KIPS
(27) MEASURE NEW SHIMS (INCH)	9.4

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 102° F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.Tendon Number 56DFCalculation By RT KRUPICKACalculation Checked By S. DannerPressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiField end: Ram # 9178 Gage # 2 Ram Area 149.730 in²Pressure = 848,300 lb ÷ 149.730 in² = 5665 psiPressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 89 / 90 = 5603 psi

Field end:

Pressure = 5665 psi X 89 / 90 = 5603 psiPressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4543 psi X 89 / 90 = 4493 psi 4623 / 4358

Field end:

Pressure = 4467 psi X 89 / 90 = 4417 psi 4550 / 4235

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 68DF (2) LOCATION SHOP (3) DATE 11-4-75
(4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY RTKRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	72°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.5
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4460 PSIG (2) 4450 PSIG (3) 4450 PSIG AVG. 4453 PSIG 667 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	78°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	2.2
(22) PRESSURIZE TO .8f _{pu} (5265 PSI)	5265
(23) MEASURE ELONGATION AT .8f _{pu}	7.55
(24) SHIM TO NEW LIFT-OFF*	4453
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4450 PSIG (2) 4520 PSIG (3) 4460 PSIG AVG. 4477 PSIG 670 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.75

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 102°F
FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>68DF</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>11-4-75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY L. GRANDY

DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.8
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4530 PSIG
	(2) 4480 PSIG
	(3) 4510 PSIG
	AVG. 4507 PSIG 675 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (15) RECORDED BY RT KRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	62°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	2.6
(22) PRESSURIZE TO .8 _{pu} (566 PSI)	566
(23) MEASURE ELONGATION AT .8 _{pu}	7.4
(24) SHIM TO NEW LIFT-OFF*	4507
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4560 PSIG
	(2) 4580 PSIG
	(3) 4620 PSIG
	AVG. 4587 PSIG 637 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.8

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 102°F.
FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 68 DF

Calculation By RTKRUPICKA

Calculation Checked By S. Donner

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 = 5665 psi

Field end:

Pressure = 5665 psi X 90 = 5665 psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4453 psi X 90 = 4453 psi 4587
90 4319

Field end:

Pressure = 4507 psi X 90/90 = 4507 psi 4642
4372

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. 76DF (2) LOCATION SHOP (3) DATE 11-5-75
(4) JACK No. 9185 (5) GAGE No. 1 (6) No. EFF. WIRES AT
DETENSIONING 90

DETENSIONING (9) RECORDED BY H.S. GORAWSKI
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	74°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	5.25"
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4300 PSIG (2) 4290 PSIG (3) 4240 PSIG AVG. 4273 PSIG 642 KIPS
* 4460/ (See notes attached)	
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY H.S. GORAWSKI

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	81°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	1.8
(22) PRESSURIZE TO .8f _{pu} (5645 PSI)	5665
(23) MEASURE ELONGATION AT .8f _{pu}	7.55
(24) SHIM TO NEW LIFT-OFF*	4273
(25) DEPRESSURIZE TO ZERO	
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4300 PSIG (2) 4250 PSIG (3) 4200 PSIG AVG. 4250 PSIG 638 KIPS
(27) MEASURE NEW SHIMS (INCH)	5.25

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 103°F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

**PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE**

(1) TENDON No. <u>76DF</u>	(2) LOCATION <u>FIELD</u>	(3) DATE <u>11-5-75</u>
(4) JACK No. <u>9178</u>	(5) GAGE No. <u>2</u>	(6) No. EFF. WIRES AT DETENSIONING <u>90</u>

DETENSIONING (9) RECORDED BY RTKRUPICKA
DESCRIPTION

ACTUAL MEASURED

(8) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	61°
(9) CHECK GAGES (ZERO)	YES
(10) MEASURE SHIMS (INCH)	6.3
(11A) OBTAIN LIFT-OFF PRESSURE AND FORCE	(1) 4420 PSIG
	(2) 4420 PSIG
	(3) 4420 PSIG
	AVG. 4420 PSIG 662 KIPS
(11B) MAXIMUM GAGE PRESSURE PRIOR TO DETENSIONING (PSI)	5000
(12) DEPRESSURIZE TO ZERO	YES
(13) REMOVE RAM	YES
(14) WAS INSPECTION WIRE CUT AT THIS END?	No
(15) CHECK CONTINUITY	YES (90)

RETENSIONING (16) RECORDED BY RTKRUPICKA

(17) NUMBER OF EFFECTIVE WIRES AT RETENSIONING	90
(18) CONTAINMENT EXTERIOR CONCRETE TEMPERATURE NEAR TENDON ANCHORAGE	61°
(19) CHECK GAGES (ZERO)	YES
(20) PRESSURIZE TO 1000 LB/WIRE (603 PSI)	603
(21) MEASURE ELONGATION** (INCH)	2.1
(22) PRESSURIZE TO .8 _{fu} (5665 PSI)	5665
(23) MEASURE ELONGATION AT .8 _{fu}	7.0
(24) SHIM TO NEW LIFT-OFF*	4420
(25) DEPRESSURIZE TO ZERO	YES
(26) OBTAIN NEW LIFT-OFF PRESSURE AND FORCE	(1) 4460 PSIG
	(2) 4460 PSIG
	(3) 4460 PSIG
	AVG. 4460 PSIG 668 KIPS
(27) MEASURE NEW SHIMS (INCH)	6.2"

*NEW LIFT-OFF IS APPROXIMATELY EQUAL TO THAT MEASURED DURING DETENSIONING
LESS THE EFFECT OF ANY REDUCTION IN THE NUMBER OF EFFECTIVE WIRES.

**ELONGATION IS THE DISTANCE FROM THE OUTSIDE FACE OF THE BEARING PLATE
TO THE INSIDE FACE OF THE ANCHOR HEAD.

CONTAINMENT INTERIOR AIR TEMP. 103° F.

FIGURE C-2 DETENSIONING & RETENSIONING DATA

Calculation of pressure at .8 X Ultimate Strength and Pressure for Liftoff after Retensioning.

Tendon Number 76DF
 Calculation By RTKRUPICKA
 Calculation Checked By S. Denner

Pressure for .8 X Ultimate during detensioning

Force = .8 X 240,000 X .04909 X Number of effective wire

Force = .8 X 240,000 X .04909 X 90 = 848,300 lb

Pressure = Force ÷ Ram area

Shop end: Ram # 9185 Gage # 1 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Field end: Ram # 9178 Gage # 2 Ram Area 149.730 in²

Pressure = 848,300 lb ÷ 149.730 in² = 5665 psi

Pressure for .8 X Ultimate during retensioning

Pressure = (P for .8 X Ultimate during detensioning) X No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 5665 psi X 90 / 90 = 5665 psi

Field end:

Pressure = 5665 psi X 90 / 90 = 5665 psi

Pressure for final liftoff during retensioning

Pressure = (P at Liftoff During Detensioning) X

No. Effective Wires Retensioning

No. Effective Wires Detensioning

Shop end:

Pressure = 4273 psi X 90/90 = 4273 psi 4402
4145

Field end:

Pressure = 4420 psi X 90/90 = 4420 psi 4553
4387

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
Melrose Park, Illinois 60161
312-379-9600

Post Tensioning Division



November 5, 1975

HOOP TENDON # 76 DF. SHOP END.

LIFT OFF MEASUREMENT:

During the initial lift off measurement, gage pressure of 4460 psig (669 kip) was measured. When the shims became loose, two pieces of shim fell out from the bottom side of shim stack. Not being able to reinstall these shims in their original position in the shim stack, three consecutive lift off measurements were taken with a partial shim stack in place. This procedure resulted in lift off reading lower than the initial lift off measurement.

Henry S. Gorawski
Henry S. Gorawski

APPENDIX E

Calibration Data for Tendon Stressing Jacks..

PALISADES 217881

JACK DESCRIPTION: 750 Ton REGISTER NO: # 9178
 HEAVY DUTY RAM AREA: _____ MAX. PRESSURE: 5650 P.S.I. 5650
 LOAD CELL CAPACITY: 1.6T REGISTER NO: 6517 CONSTANT: _____
 GAUGE DESCRIPTION: FORNEY REGISTER NO: # 2
 JACK POSITION: 7

	TARGET PSI	P.S.I. GAUGE	LOAD CELL READOUT	COMPUTED FORCE	COMPUTED RAM AREA
	1000	1100	10.1		
	2000	2160	22.9		
	3000	3140	29.2	463083	147.478
	4000	4020	38.2	605814	150.700
	5000	5020	47.4	751717	150.343
	6000	5660	53.0	840527	148.503
	7000				
	8000				
	9000				

JACK POSITION: 6

	1000	1000	10.4		
	2000	2200	21.4		
	3000	3100	28.5	456739	147.335
	4000	4050	38.7	613743	151.916
	5000	5050	47.0	745373	149.076
	6000	5700	53.6	850042	149.130
	7000				
	8000				
	9000				

JACK POSITION: _____

	1000				
	2000				
	3000				
	4000				
	5000				
	6000				
	7000				
	8000				
	9000				

Area = Readout x Loadcell Constant ÷ P.S.I. (Gauge Reading)

average ram area = 149.310 sq. in.


Calculated by
E. G. Hedder
8/20/75

CALIBRATED BY: Eugene Hill

DATE: 8/16/75

HYDRAULIC JACK CALIBRATION RECORD PALMSADES 217881

JACK DESCRIPTION: 750 TON REGISTER NO: #9185

TH  CAL RAM AREA: 150.6 MAX. PRESSURE: 5650 P.S.I.

LOAD CELL CAPACITY: 1.6 M REGISTER NO: PLH CONSTANT:

GAUGE DESCRIPTION: FORRELL #2 REGISTER NO:

RAM POSITION: 4

	TARGET PSI	P.S.I. GAUGE	LOAD CELL READOUT	COMPUTED FORCE	COMPUTED RAM AREA
	1000	1050	10.8		
	2000	2150	20.8		
	3000	3100	29.5	467941	150.916
	4000	4000	38.1	604228	151.056
	5000	5000	46.9	743787	148.757
	6000	5700	53.7	851628	149.408
	7000				
	8000				
	9000				


RAM POSITION: 6

	TARGET PSI	P.S.I. GAUGE	LOAD CELL READOUT	COMPUTED FORCE	COMPUTED RAM AREA
	1000	1000	10.6		
	2000	2000	20.0		
	3000	3000	28.7	455153	151.717
	4000	4050	38.5	607400	149.975
	5000	5000	47.5	753703	148.874
	6000	5650	53.6	850042	150.500
	7000				
	8000				
	9000				

RAM POSITION:

	TARGET PSI	P.S.I. GAUGE	LOAD CELL READOUT	COMPUTED FORCE	COMPUTED RAM AREA
	1000				
	2000				
	3000				
	4000				
	5000				
	6000				
	7000				
	8000				
	9000				

Ram Area = Readout x Loadcell Constant ÷ P.S.I. (Gauge Reading)

Cor  and average ram area = 150.150 sq. in.

calculated by
E. J. [signature]
8/23/75

CALIBRATED BY: 8/15/75

E. J. [signature]
DATE: 8/15/75

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON, D.C. 20234

Lab No. 213.04/207408
Cost Center No. 2130604
Order No. 21P1137
Dated: 10-16-72

REPORT OF CALIBRATION

LOAD CELL SYSTEM

submitted by

Inland-Ryerson Construction Products Company
Melrose Park, Illinois

Load Cell: Brewer No. 418, 1,600,000 lbf, Compression

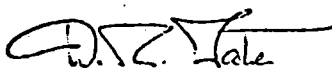
Indicator: BLH No. 1130

Standardizer: BLH No. 1406

The load cell system was calibrated by direct comparison against the integral force-measurement system of the NBS 12,000,000 lbf testing machine. The uncertainty of the applied force did not exceed 0.5 percent of load.

The calibration procedures followed and the loads selected were those requested by the submitter. Prior to the calibration, the indicator was standardized by adjusting the span control to give a reading of 100.00 percent with the BLH Precision Calibrator, serial no. 1406, connected and set to 2.0 mV/V and 120 ohms. Standardization of the indicator in this manner is recommended before each use. The loads were applied in the sequence shown in the table without returning to zero between test loads. The indicator was read to the minimum value commensurate with the graduations on the scale and the stability of the system during calibration. The results of the calibration in tabular form are attached.

For the Director
Institute for Basic Standards,


A. F. Kirstein, Acting Chief
Engineering Mechanics Section
Mechanics Division

Attachment: 1 Table

NOV 7 1972

Table 1 - Calibration of Load Cell System in Compression

Brewer Load Cell No. 418

BLH Indicator No. 1130

BLH Standardizer No. 1406

Calibration completed on November 1, 1972

Applied load lbf	Indicator reading at 21 °C		
	Run 1 percent	Run 2 percent	Run 3 percent
0	0.00	0.00	0.00
160,000	10.56	10.56	10.55
320,000	20.47	20.39	20.50
480,000	30.55	30.46	30.48
640,000	40.55	40.40	40.44
800,000	50.44	50.36	50.44
960,000	60.45	60.42	60.34
1,120,000	70.37	70.30	70.25
1,280,000	80.11	80.07	80.06
1,440,000	90.06	90.06	89.98
1,600,000	100.02	99.90	99.95
0	0.00	0.00	0.00

Indicator read to the nearest 0.01 percent

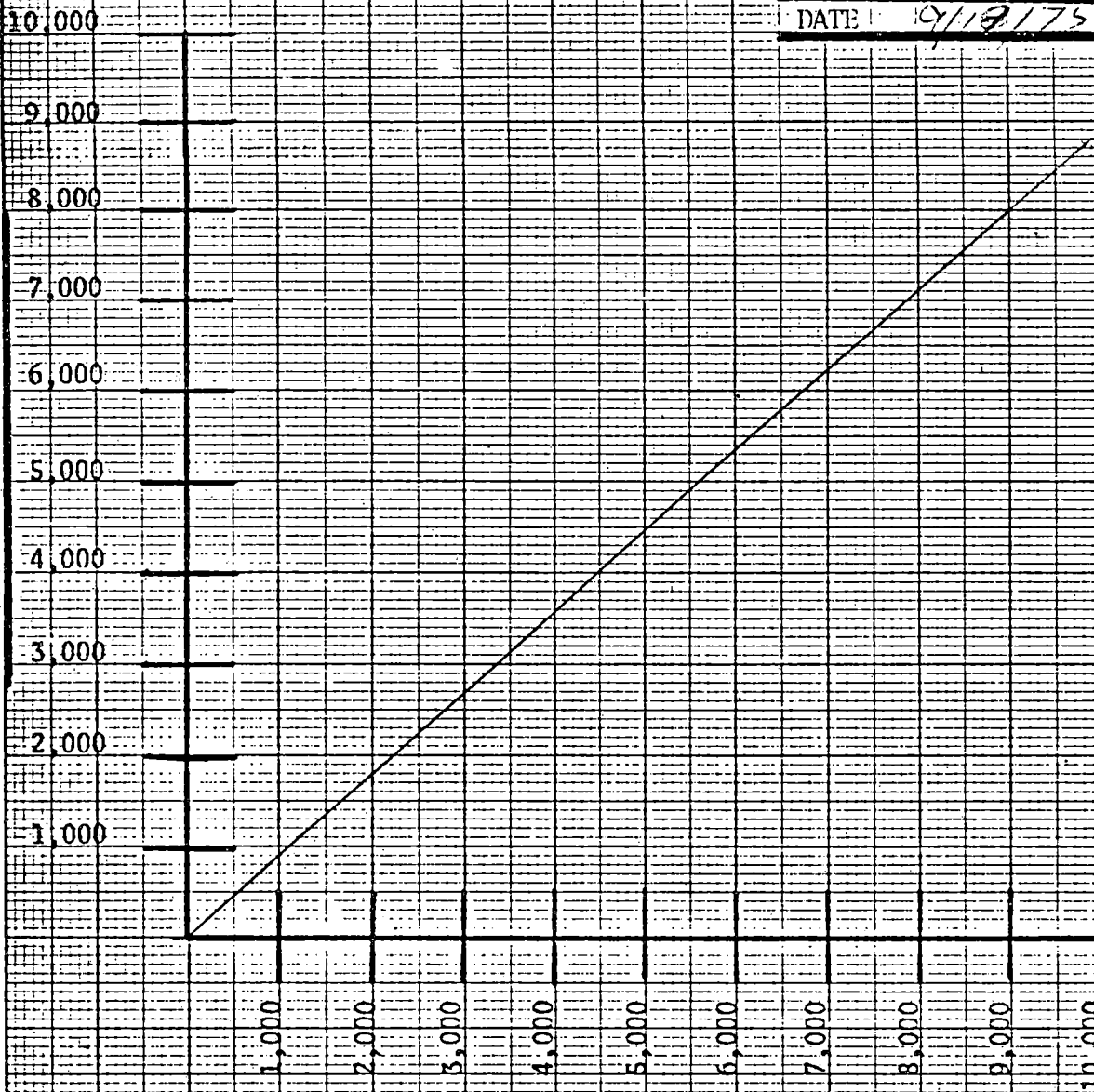
Transducer Resistance set to 120 ohms

Transducer Output set to 2.0 mV/V

Temperature during calibration 23 °C

GAUGE NO. Farney #1DATE 9/19/75

ACTUAL GAUGE P.S.I.



THEORETICAL PSI TESTER WEIGHTS

Weights	1st Row	2nd Row	Mansfield & Green Dead Weight Pressure Model R100 Serial #1422
Gauge P.S.I.			
1000	980	990	
2000	1980	1980	
3000	3000	3000	
4000	4000	4000	
5000	5000	5000	
6000	6000	6000	
7000	7000	7000	
8000	8000	8000	
9000	9000	9000	
10,000			
Calibrated By: <u>Paul H. Hosen</u>			

INLAND*
RYERSON

CONSTRUCTION PRODUCTS COMPANY

BOX 1056, MELROSE PARK, ILLINOIS 60161

GAUGE NO. *FEEH-4#2*DATE *9/19/75*

ACTUAL GAUGE P.S.I.

10,000

9,000

8,000

7,000

6,000

5,000

4,000

3,000

2,000

1,000

1,000

2,000

3,000

4,000

5,000

6,000

7,000

8,000

9,000

10,000

THEORETICAL PSI TESTER WEIGHTS

*1st Row**2nd Row*

Weights

Gauge P.S.I.

Mansfield & Green

Dead Weight Pressure

Model R100 Serial #1422

1000

1000

1000

2000

2000

2000

3000

3020

3000

4000

4000

4000

5000

5000

5000

6000

6000

6000

7000

7000

7000

8000

7980

7990

9000

8980

8980

10,000

Calibrated by: *Paul A. Mahan***INLAND
RYERSON**

CONSTRUCTION PRODUCTS COMPANY

BOX 1056, MELROSE PARK, ILLINOIS 60161

AMETEK / Mansfield & Green

6185 COCHRAN ROAD, SOLON, OHIO 44139

TELEPHONE 216/248-1020

CERTIFICATION

FROM

M & G STANDARDS LABORATORY

FOR INLAND-RYERSON CONSTRUCTION PRODUCTS CO.

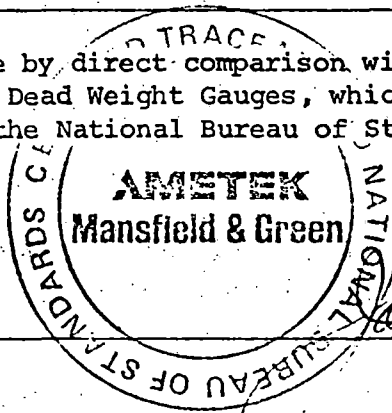
ON MANSFIELD & GREEN PRESSURE TESTER TYPE R-100

PURCHASE ORDER NUMBER		M & G ASSY. & CALIBRATION No.	SERIAL NO.
21P2492		M-38399-00-J	1422
CALIBRATION DATE		RECALIBRATION DATE	
April 22, 1975		April 22, 1976	
LABORATORY TEMP.	HUMIDITY	CODE NO.	
75°F	50%		
TEST TECHNICIAN			

M. Burton

CERTIFICATION

The calibration was made by direct comparison with AMETEK/Mansfield & Green Laboratory Master Dead Weight Gauges, which are traceable to standards certified by the National Bureau of Standards.



AMETEK/MANSFIELD & GREEN

John M. Watson

CALIBRATION PROCEDURE:

Pressure readings expressed at:

- United States Mean Gravity ---980.000 CM/SEC²
- XX International Standard Gravity---980.665 CM/SEC²
- Local Gravity CM/SEC²

Certificates, data, and reports specifying traceability for our reference and working standards are covered under National Bureau of Standards Report No. P6540, P3997, P7239, P7240 and/or 6.6/156007, 2.6/167338, 187835, 2.6/166610, 198182, P7229 and 232.09/201937.

SOLOON, OHIO 44139

CUSTOMER INLAND-RYERSON CONSTRUCTION PRODUCTS CO. CUSTOMER ORDER NO. 21P2492
DISTRIBUTOR _____ DIST. ORDER NO. _____
TYPE R TYPE NO. R-100 SERIAL NO. 1422
M & G ORDER NO. M-38399-00-J TEST TECHNICIAN M. Burton DATE April 22, 1975

Form No. 71.8

RAM # 9178
RAM AREA
149.310
CALIBRATED
8/16/75

GAUGE # 2

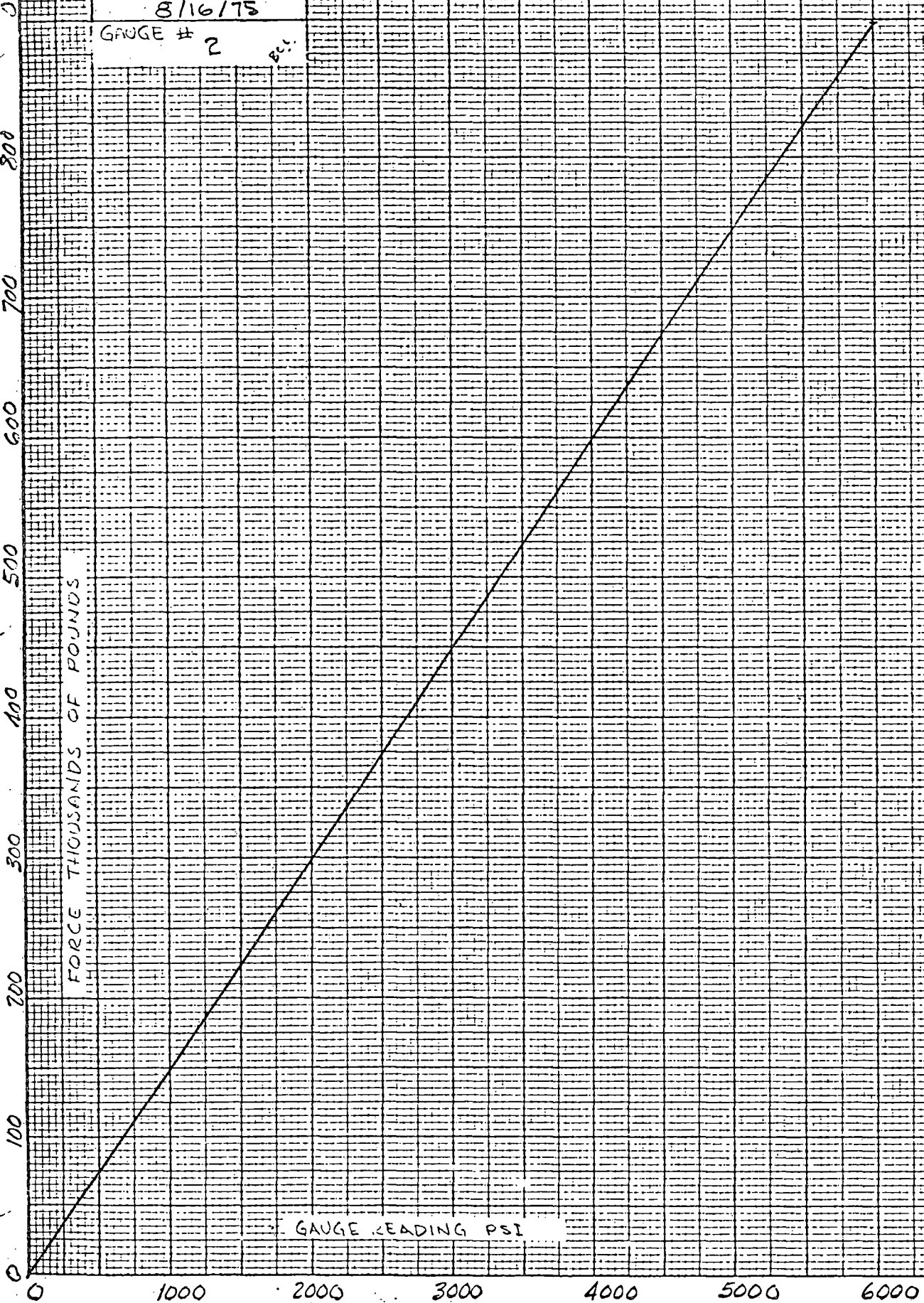
B.C.



INRYCO
an INLAND STEEL company

FORCE THOUSANDS OF POUNDS

GAUGE READING PSI





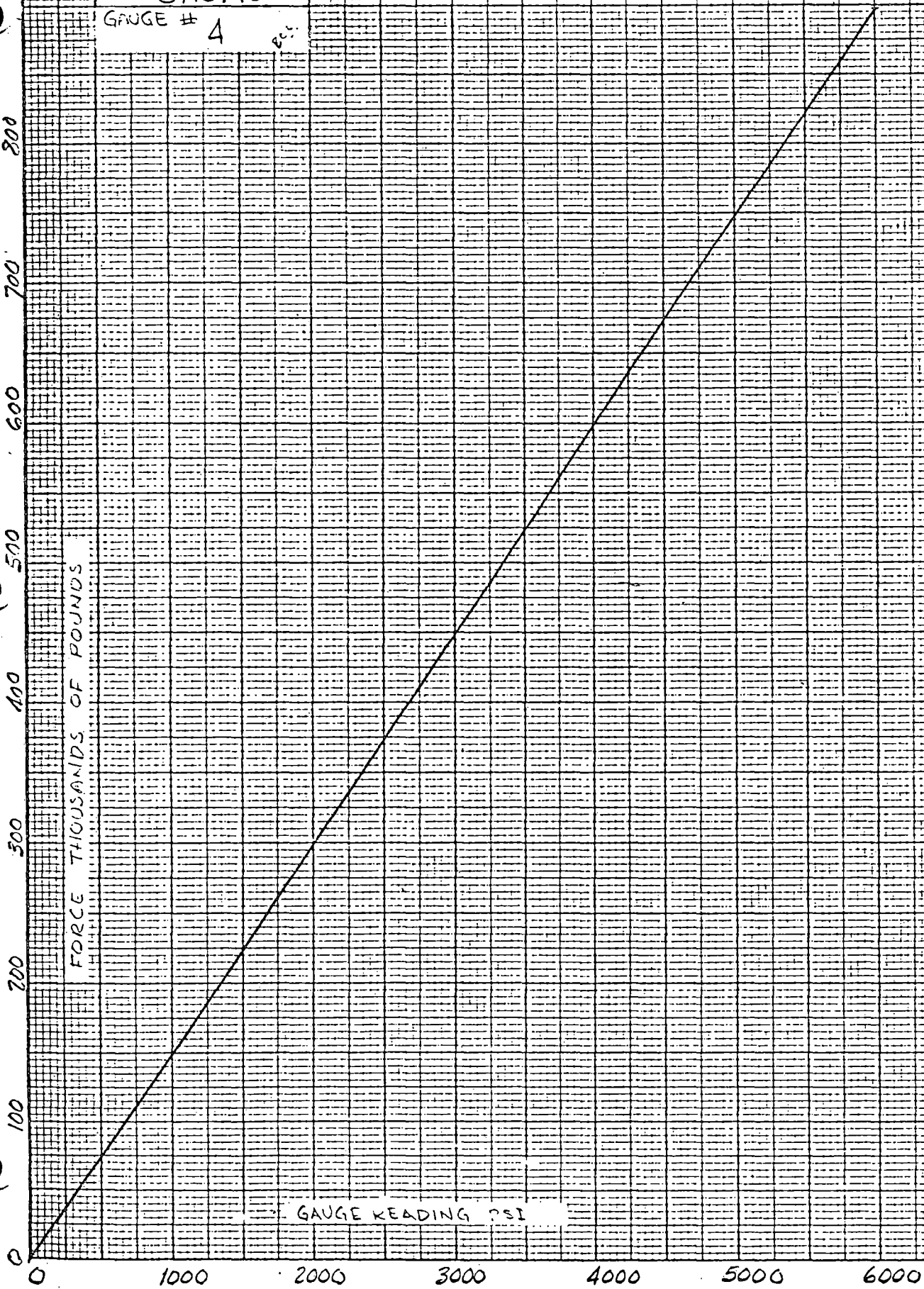
INRYCO
an INLAND STEEL company

RAM # 9178
RAM AREA
149.310
CALIBRATED
8/16/75

GAUGE # 4

FORCE THOUSANDS OF POUNDS

GAUGE READING PSI





INRYCO
an INLAND STEEL company

RAM # 9185
RAM AREA
150.150
CALIBRATED
8/15/75

GAUGE # 1

60%

FORCE THOUSANDS OF POUNDS

GAUGE READING PSI

0 100 200 300 400 500 600 700 800

0 1000 2000 3000 4000 5000 6000

RAM # 9185
RAM AREA
150.150
CALIBRATED
8/15/75

GAUGE # 20



Tensioning Division

FORCE THOUSANDS OF POUNDS

GAUGE READING PSI

800
700
600
500
400
300
200
100
0

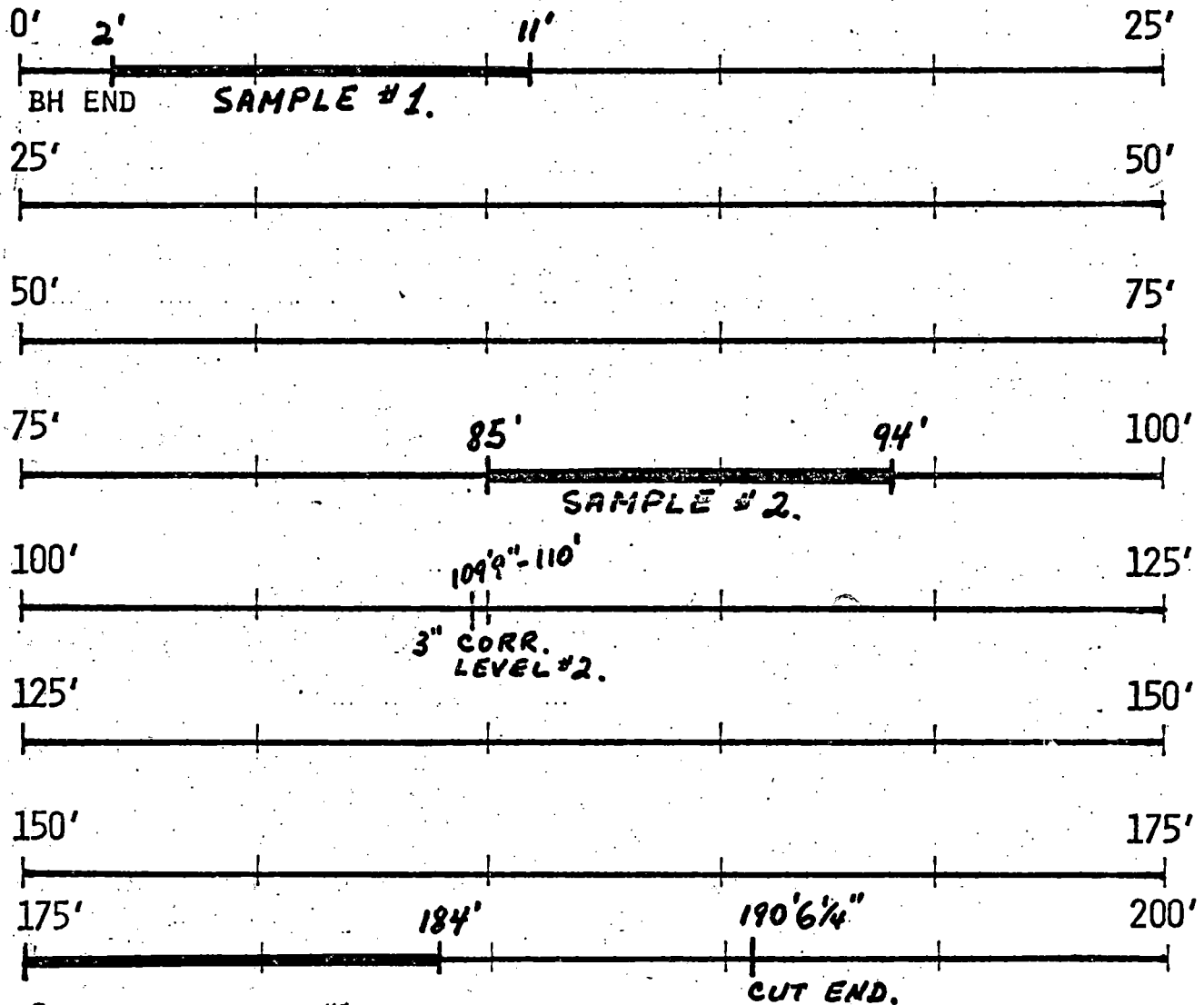
0 1000 2000 3000 4000 5000 6000

APPENDIX F

Wire Inspection Data Sheets.

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION V-86
DATE TENDON INSPECTED 11-11-75 By H.S. GORAWSKI
WIRE LENGTH (FT) 190'6 1/4"

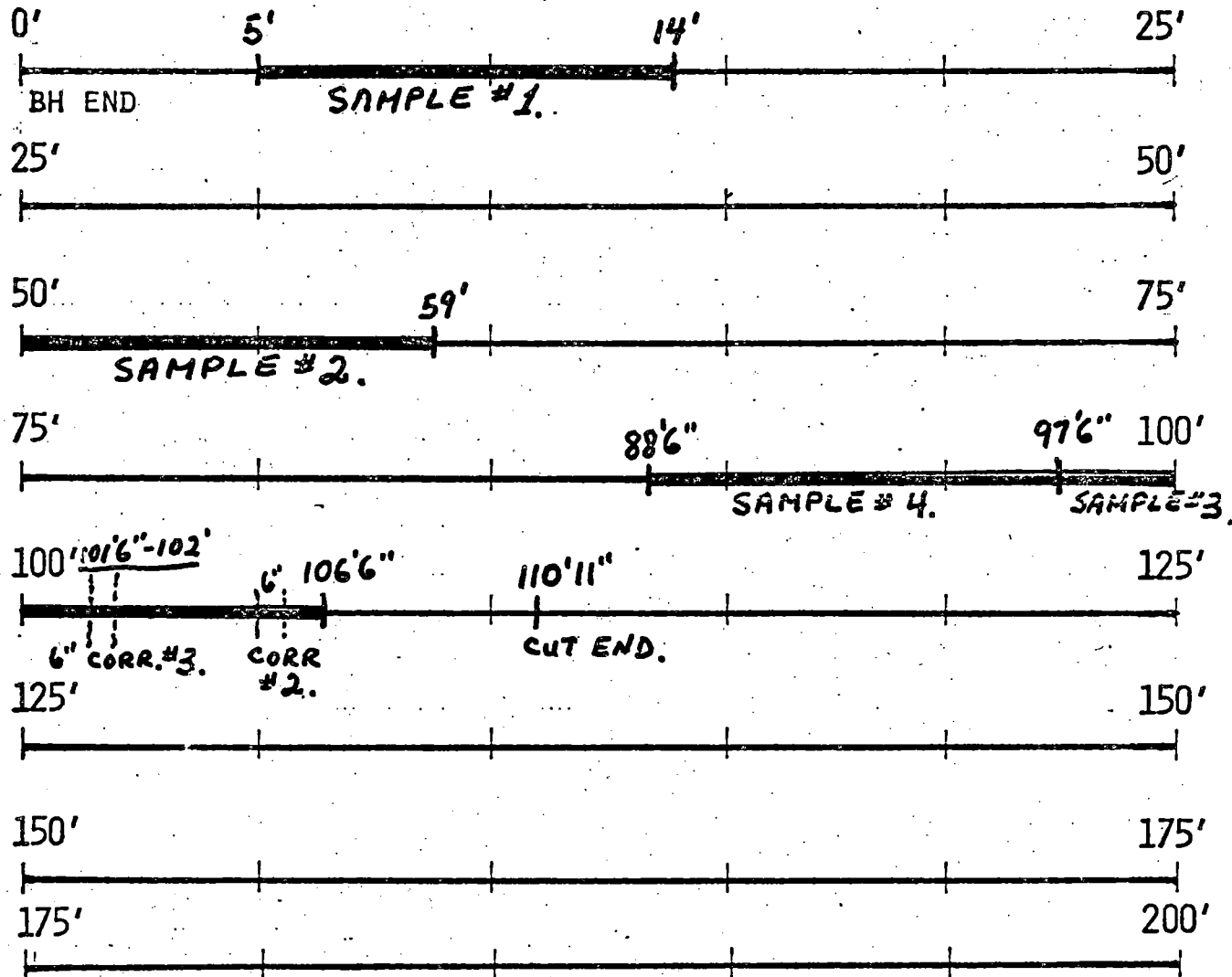


CORROSION LEVEL #1 NO VISIBLE OXIDATION.
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .005''$
#5 $.005'' < \text{PITTING} \leq .010''$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION D3-49
DATE TENDON INSPECTED 11-10-75 BY H. S. GORAWSKI
WIRE LENGTH (FT) 110'11"

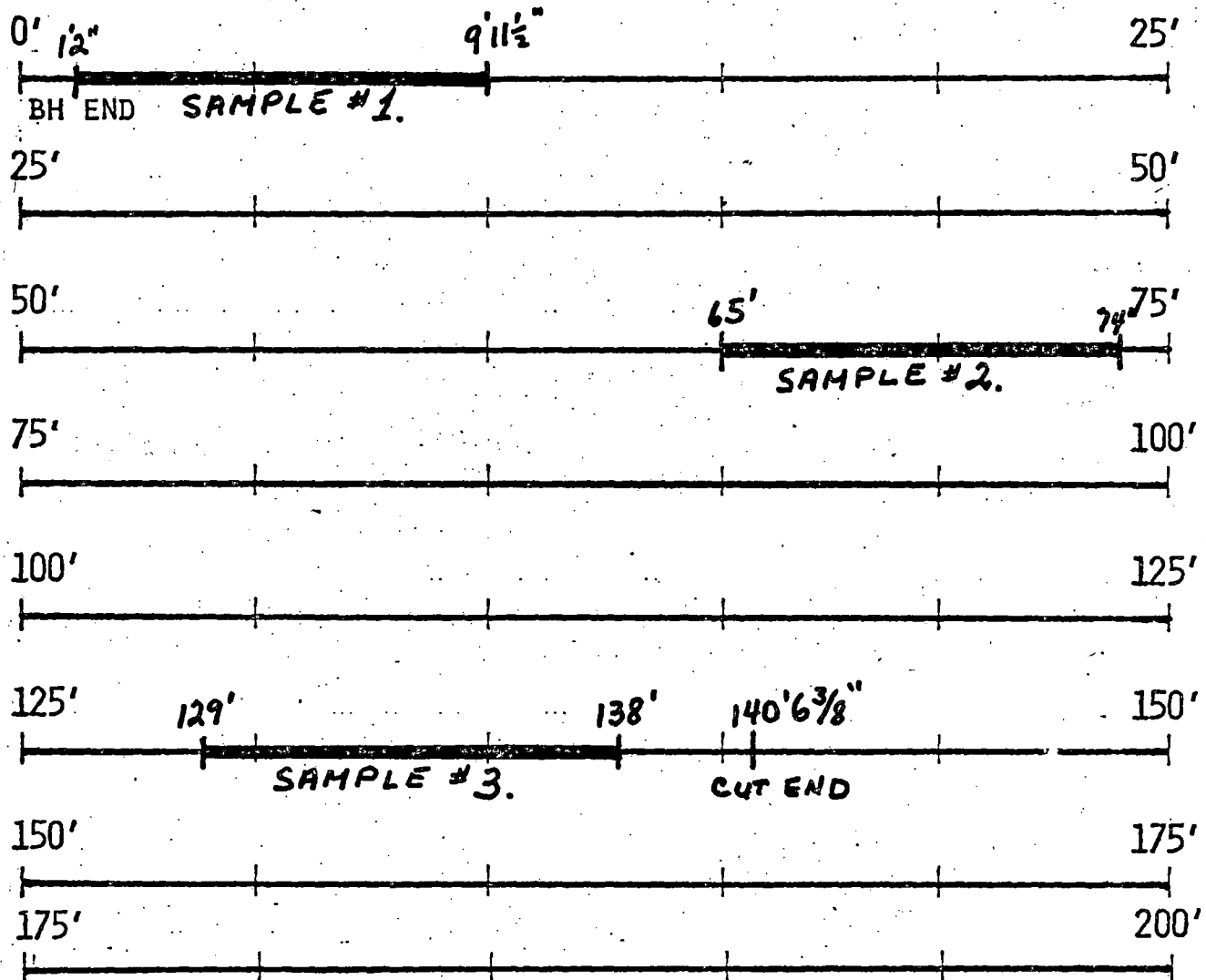


CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003"$
#4 $.003" < \text{PITTING} \leq .003"$
#5 $.006" < \text{PITTING} \leq .010"$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION 56 DF
DATE TENDON INSPECTED 11-10-75 BY H. S. GORAWSKI
WIRE LENGTH (FT) 140'6 $\frac{3}{8}$ "

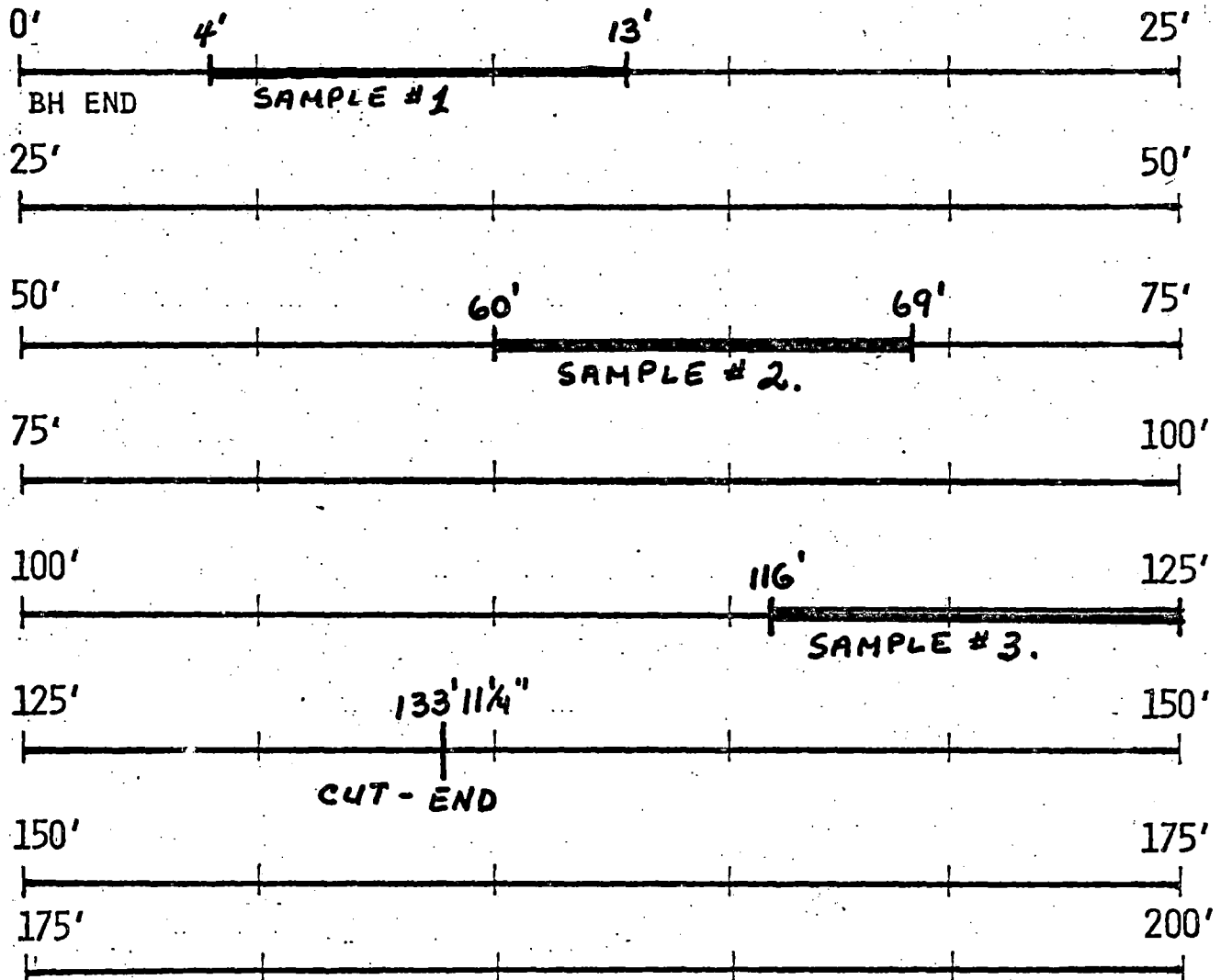


CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003"$
#4 $.003" < \text{PITTING} \leq .003"$
#5 $.006" < \text{PITTING} \leq .010"$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION DI-33
DATE TENDON INSPECTED 11-10-75 BY H.S. GORAWSKI
WIRE LENGTH (FT) 133' 11 1/4"



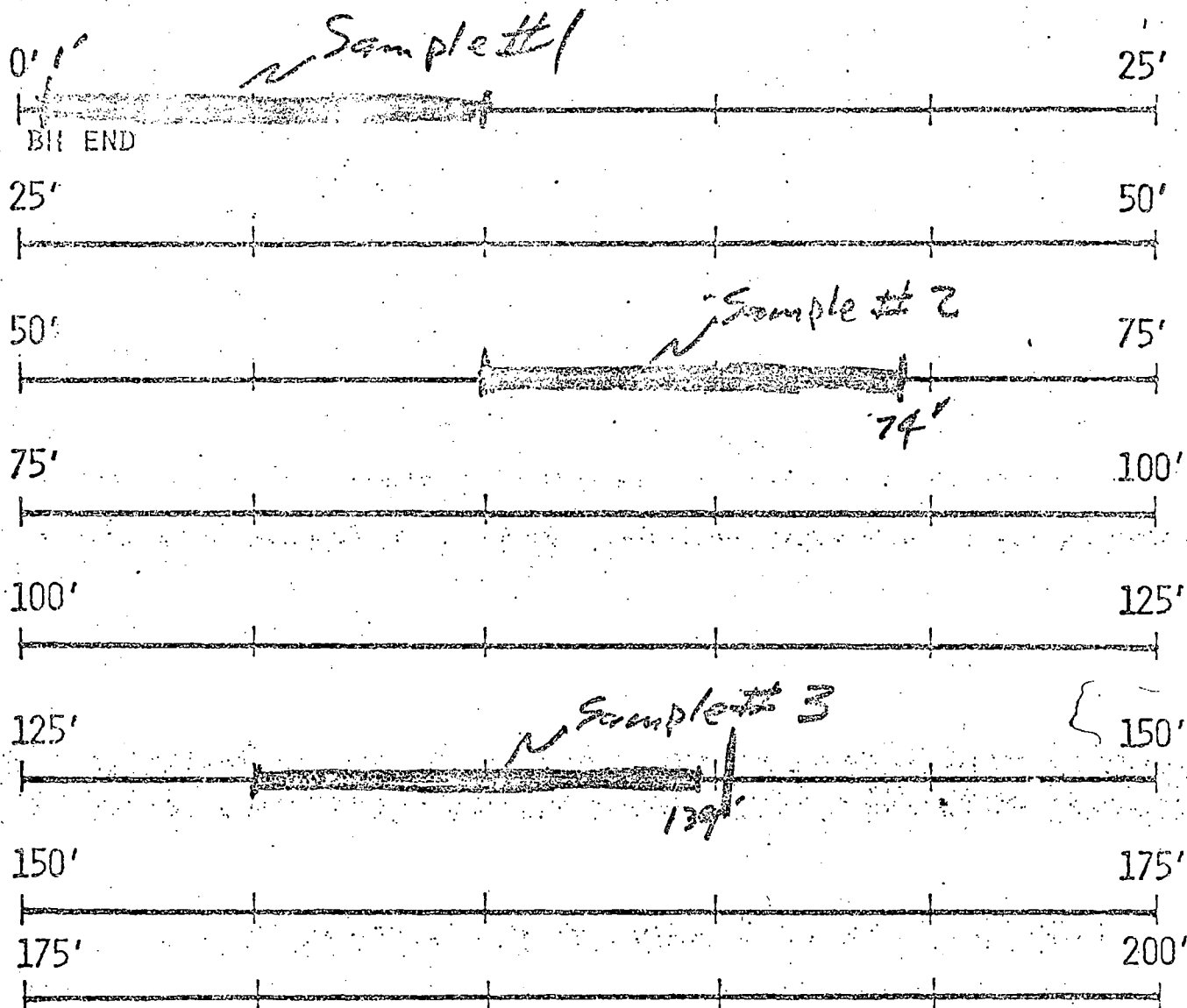
CORROSION LEVEL #1 NO VISIBLE OXIDATION.
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .003''$
#5 $.006'' < \text{PITTING} \leq .010''$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

Wire #1

TENDON IDENTIFICATION 59 BD
DATE TENDON INSPECTED 11/20/75 BY FC
WIRE LENGTH (FT) 140 ft. 5 1/4 in.



CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .003''$
#5 $.005'' < \text{PITTING} \leq .010''$

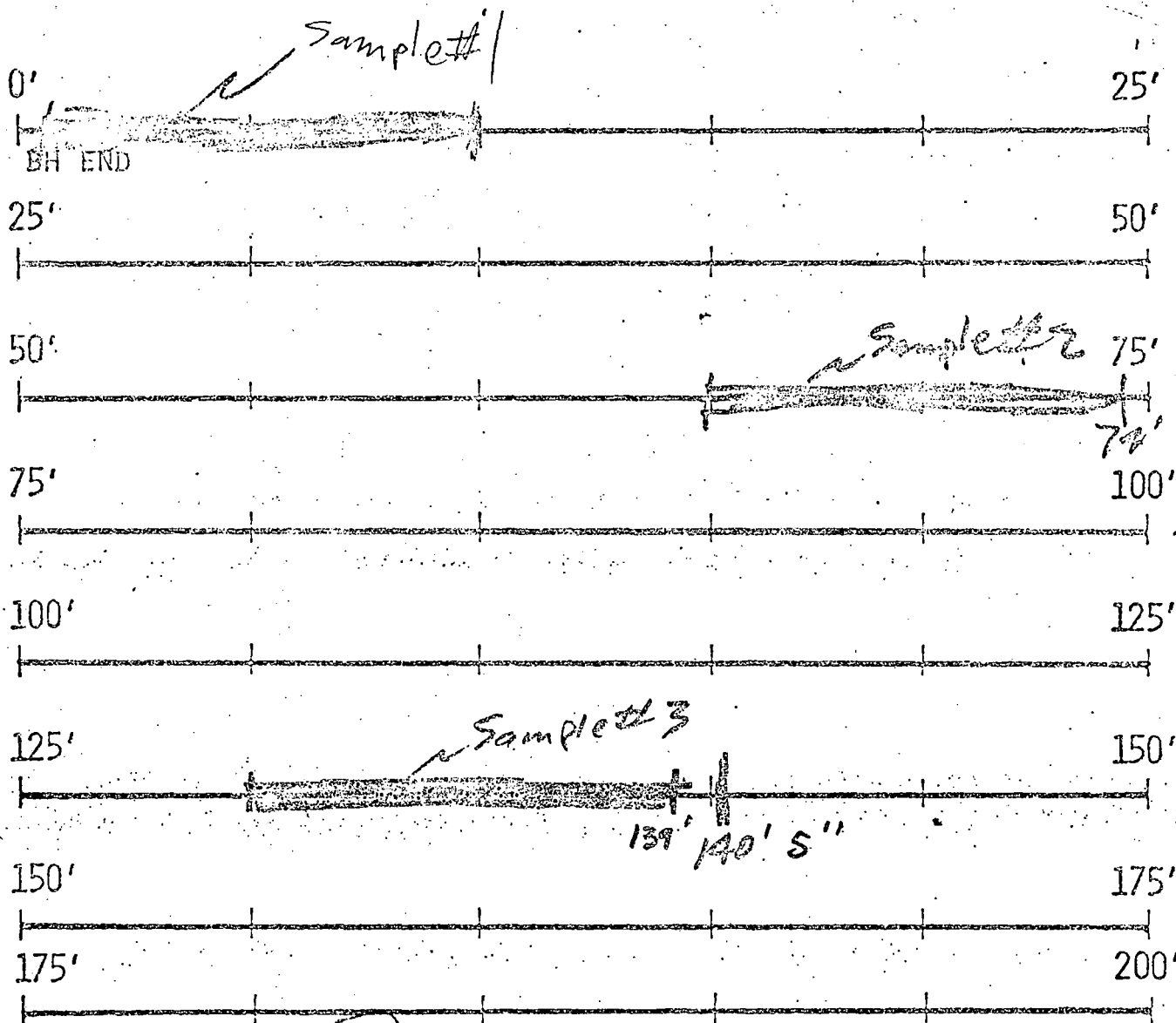
FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

Wire # 2

TENDON IDENTIFICATION 59 BD
DATE TENDON INSPECTED 11/20/75
WIRE LENGTH (FT) 190 ft. 5 in.

By FC.



CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .006''$
#5 $.006'' < \text{PITTING} \leq .010''$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

Wire #3

TENDON IDENTIFICATION

59BD

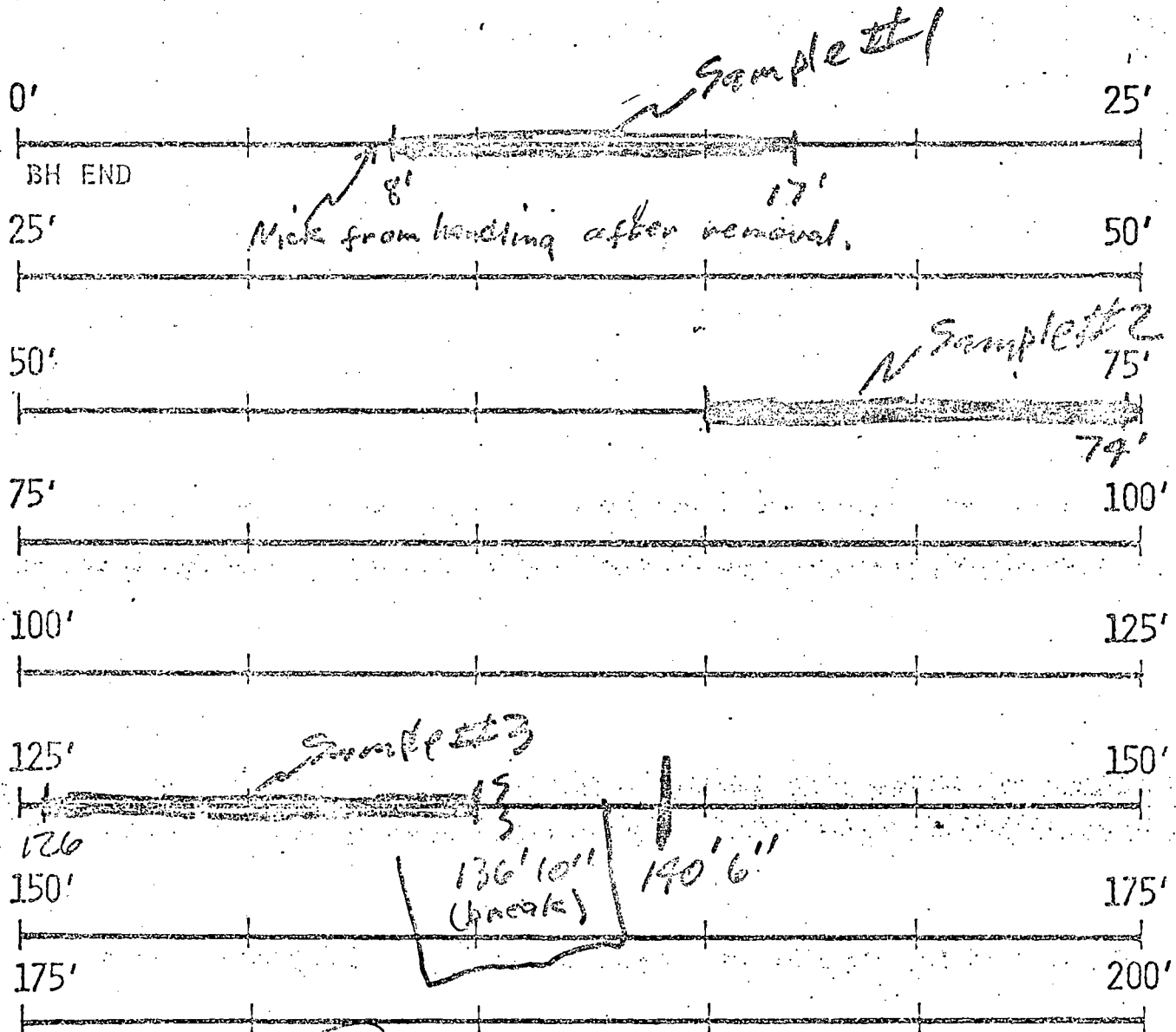
DATE TENDON INSPECTED

11/20/75

BY

FC.

WIRE LENGTH (FT)



CORROSION LEVEL

#1 NO VISIBLE OXIDATION

#2 VISIBLE OXIDATION, NO PITTING

#3 $0 < \text{PITTING} \leq .003''$

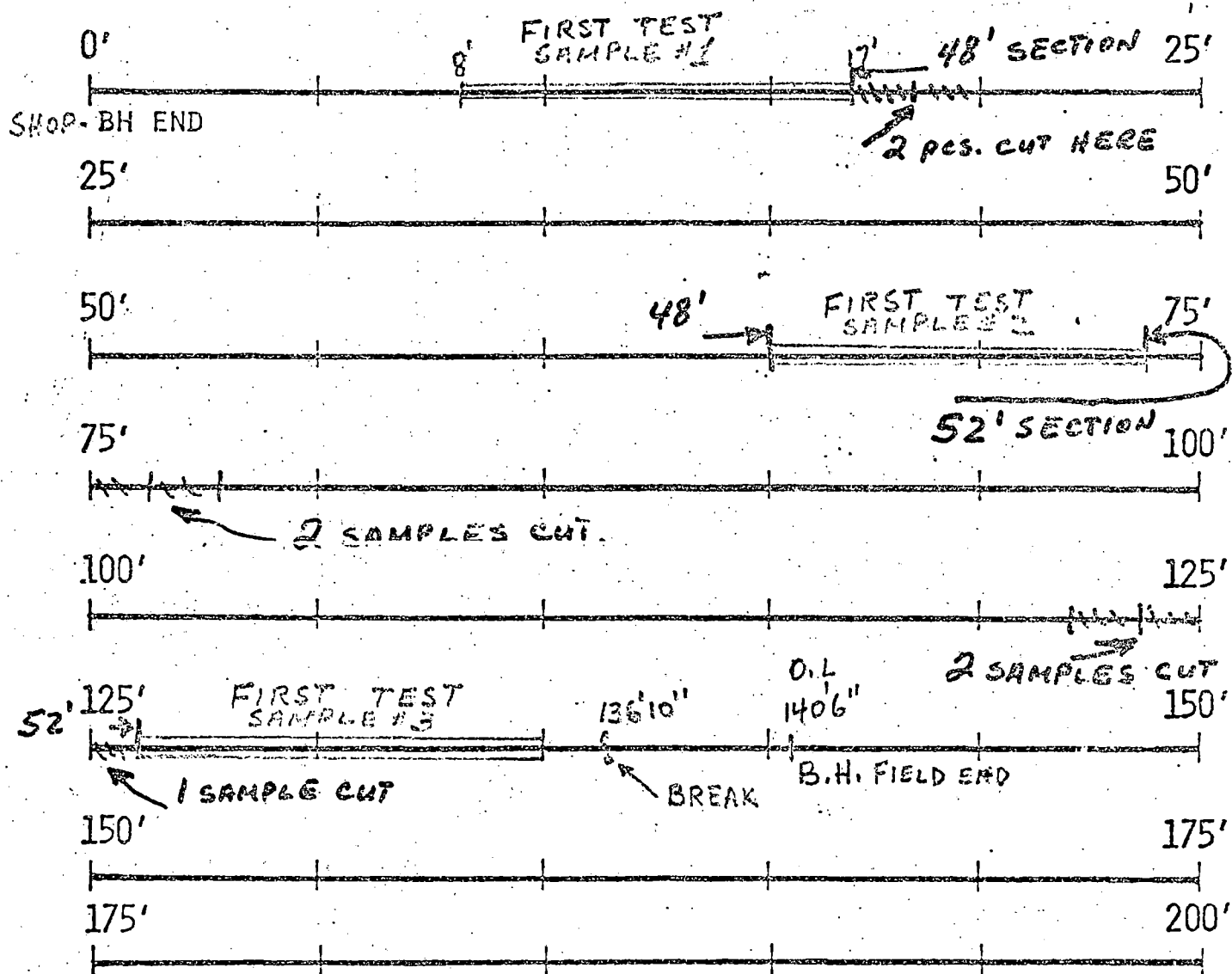
#4 $.003'' < \text{PITTING} \leq .003''$

#5 $.006'' < \text{PITTING} \leq .010''$

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION 59 BD - TEST SPECIMENS FOR
DATE TENDON INSPECTED _____ BY 2ND TENSILE TEST
WIRE LENGTH (FT) WIRE # 3



CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .003''$
#5 $.006'' < \text{PITTING} \leq .010''$

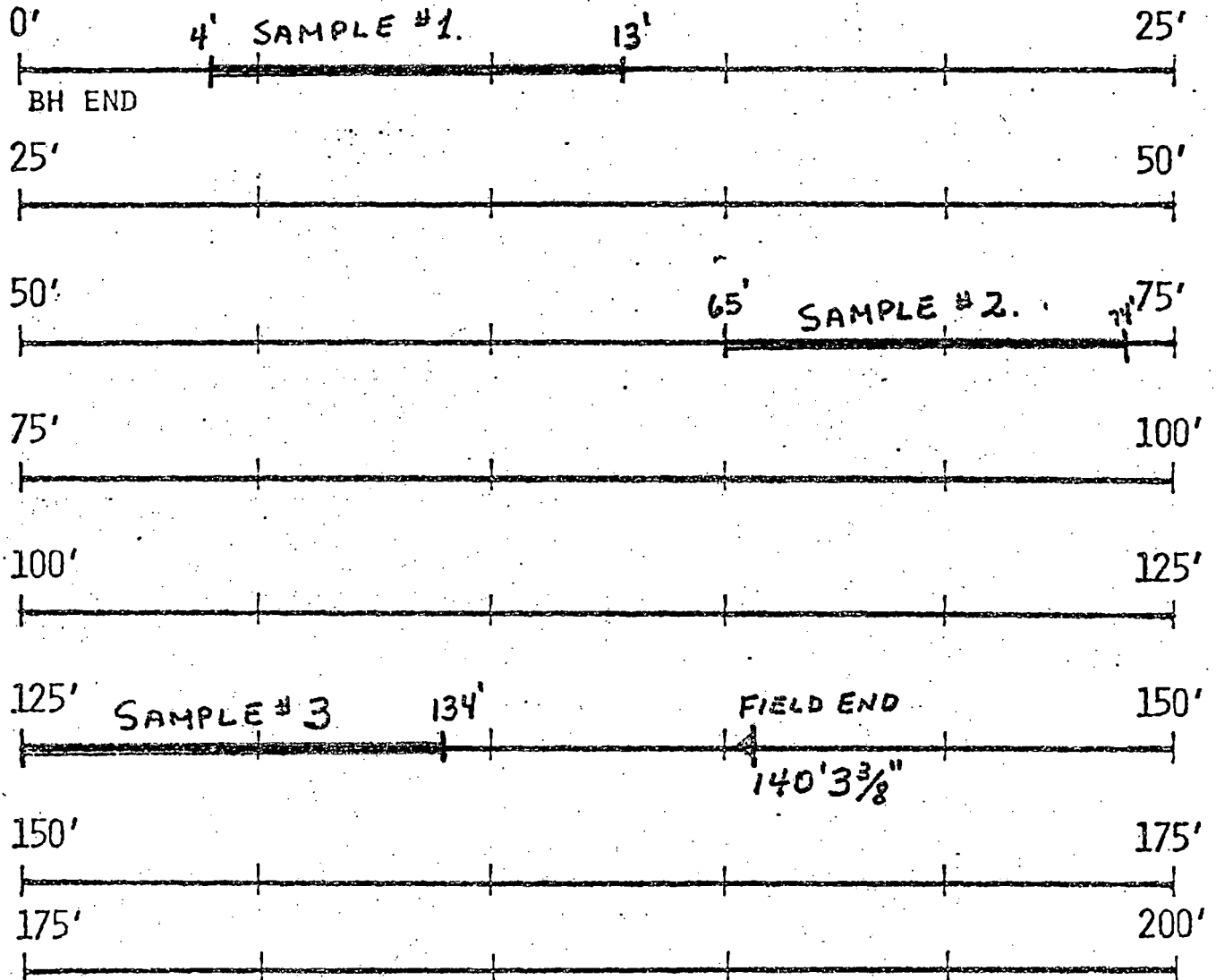
5 pes. 17" LONG CUT FOR 2ND TEST.

FIGURE C-4 TENDON WIRE INSPECTION

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
WIRE INSPECTION DATA

TENDON IDENTIFICATION 79 BF
DATE TENDON INSPECTED 12.1.75 BY H.S. GORAWSKI
WIRE LENGTH (FT) 140' 3³/₈"

SHOP END



CORROSION LEVEL #1 NO VISIBLE OXIDATION
#2 VISIBLE OXIDATION, NO PITTING
#3 $0 < \text{PITTING} \leq .003''$
#4 $.003'' < \text{PITTING} \leq .003''$
#5 $.006'' < \text{PITTING} \leq .010''$

FIGURE C-4 TENDON WIRE INSPECTION

APPENDIX G

Tendon Wire Test Data Sheets.

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page #4.

(1) TENDON IDENTIFICATION	V-86
(2) SAMPLE NUMBER	#1
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 1/2
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5680
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 5/8
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6680
(16) RECORD RULER READING AT FAILURE (IN)	6 7/8
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	21 9/16 (FIXED END)

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP - CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page #4.

(1) TENDON IDENTIFICATION	V-86
(2) SAMPLE NUMBER	#2
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99½
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5700
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6800
(16) RECORD RULER READING AT FAILURE (IN)	6 5/8
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	28½"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP - CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page # 4.

(1) TENDON IDENTIFICATION	V-86
(2) SAMPLE NUMBER	#3
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.2495
(6) MEASURE GAGE LENGTH (IN)	99½
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5700
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6900
(16) RECORD RULER READING AT FAILURE (IN)	6½
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	7 1/16

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page #4

(1) TENDON IDENTIFICATION	D3-49
(2) SAMPLE NUMBER	#1
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99 $\frac{9}{16}$ "
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5700
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 $\frac{9}{16}$ "
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	7000
(16) RECORD RULER READING AT FAILURE (IN)	7 $\frac{5}{16}$ "
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	44 $\frac{1}{32}$ (FIXED END)

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page # 4.

(1) TENDON IDENTIFICATION	03-49
(2) SAMPLE NUMBER	# 2
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99 ³ / ₁₆
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5790
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 ⁵ / ₈
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	7050
(16) RECORD RULER READING AT FAILURE (IN)	7 ³ / ₁₆
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	19 ³ / ₁₆ (FIXED END)

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page # 4

(1) TENDON IDENTIFICATION	D3-49
(2) SAMPLE NUMBER	# 3
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99 ⁹ / ₁₆ "
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5750
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 ⁹ / ₁₆ "
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	7000
(16) RECORD RULER READING AT FAILURE (IN)	7 ⁹ / ₁₆ "
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	15 ³ / ₁₆ (FIXED END)

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP - CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Line # 4.

(1) TENDON IDENTIFICATION	56 DF
(2) SAMPLE NUMBER	#1.
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.2505
(6) MEASURE GAGE LENGTH (IN)	99 ⁹ / ₁₆
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5700
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 ³ / ₄
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6800
(16) RECORD RULER READING AT FAILURE (IN)	7 ⁵ / ₈
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	16 ³ / ₄

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page # 4.

(1) TENDON IDENTIFICATION	56 DF
(2) SAMPLE NUMBER	# 2
(3) DATE WIRE TESTED	11. 12. 75
(4) DATA RECORDED BY:	H. S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99½
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5600
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6780
(16) RECORD RULER READING AT FAILURE (IN)	7 1/4
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	10 1/2"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page #4

(1) TENDON IDENTIFICATION	56 DF
(2) SAMPLE NUMBER	# 3
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 1/16"
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5650
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 1/16"
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6780
(16) RECORD RULER READING AT FAILURE (IN)	7 1/16"
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	53 7/8"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page #4.

(1) TENDON IDENTIFICATION	DI-33
(2) SAMPLE NUMBER	#1.
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99½
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	-790-
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5600
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2½
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6650
(16) RECORD RULER READING AT FAILURE (IN)	7¾
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	11⅞ (FIXED END)

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page # 4.

(1) TENDON IDENTIFICATION	D1-33
(2) SAMPLE NUMBER	# 2
(3) DATE WIRE TESTED	11. 12. 75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99 7/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.895
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5750
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 1/2
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6680
(16) RECORD RULER READING AT FAILURE (IN)	7 9/16
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	53 1/8"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP. CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

Page #4

(1) TENDON IDENTIFICATION	DI-33
(2) SAMPLE NUMBER	#3
(3) DATE WIRE TESTED	11.12.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99 9/16"
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5950
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6650
(16) RECORD RULER READING AT FAILURE (IN)	7 1/2
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	9 3/4"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59 BD
(2) SAMPLE NUMBER	#1 Sample #2
(3) DATE WIRE TESTED	H.S. GORAWSKI
(4) DATA RECORDED BY:	11.21.75
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 ⁷ / ₁₆
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO 1500 PSIG*	1500.
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	790
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5400
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	29 ¹¹ / ₁₆
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6550
(16) RECORD RULER READING AT FAILURE (IN)	7 ³ / ₄
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	13 ⁵ / ₁₆

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

o/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59BD
(2) SAMPLE NUMBER	#1 Sample #1
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWALKI
(5) MEASURE WIRE DIAMETER (IN)	.2495
(6) MEASURE GAGE LENGTH (IN)	99 7/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500.
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5500
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 5/8
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6550
(16) RECORD RULER READING AT FAILURE (IN)	7 1/16
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	36 7/8

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

C/c Break

FIGURE C-5 TENDON WIRE TEST

*Jack R.A = 1.79' "2
@ 12,000 LB.*

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59BB
(2) SAMPLE NUMBER	# 1 Sample # 3
(3) DATE WIRE TESTED	H.S. GORAWSKI
(4) DATA RECORDED BY:	11.21.75
(5) MEASURE WIRE DIAMETER (IN)	.2495
(6) MEASURE GAGE LENGTH (IN)	99 5/8
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.897
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5750
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 3/4
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6550
(16) RECORD RULER READING AT FAILURE (IN)	8 1/4
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	43 3/8

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

c/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59 BD
(2) SAMPLE NUMBER	#2 Sample #2
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 9/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	_____

(9) INCREASE PRESSURE TO _____ PSIG*	1500.
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	_____
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5550
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 5/8
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6650
(16) RECORD RULER READING AT FAILURE (IN)	7 7/8
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	34 3/8

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

c/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59 BD
(2) SAMPLE NUMBER	#2 Sample #2
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.25
(6) MEASURE GAGE LENGTH (IN)	99 7/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	<u> </u>
(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	<u> </u>
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5530
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 1/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6650
(16) RECORD RULER READING AT FAILURE (IN)	7 15/16
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	9 5/8 FIXED END

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

c/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59 BD
(2) SAMPLE NUMBER	# 2 Sample # 3
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.251
(6) MEASURE GAGE LENGTH (IN)	99 1/2
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	_____
(9) INCREASE PRESSURE TO 1500 PSIG*	1500.
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	_____
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5850
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	29 1/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6600
(16) RECORD RULER READING AT FAILURE (IN)	7 5/8
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	3 5/16 FIXED END

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

c/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59BD
(2) SAMPLE NUMBER	# 3 Sample #1
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 9/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	—

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	—
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5890
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 1/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	7000
(16) RECORD RULER READING AT FAILURE (IN)	6 1/8
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	1 3/4"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

c/c Break

FIGURE C-5 TENDON WIRE TEST

*Jack R.A = 1.791¹⁰²
@ 12,000 LB.*

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59 BD
(2) SAMPLE NUMBER	#3 Sample #2
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 1/2
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	_____

(9) INCREASE PRESSURE TO 1500 PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	_____
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5800
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 1/2
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	7050
(16) RECORD RULER READING AT FAILURE (IN)	79 1/16
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	4" FIXED END

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

C/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

(1) TENDON IDENTIFICATION	59BD
(2) SAMPLE NUMBER	#3 Sample 3
(3) DATE WIRE TESTED	11.21.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.2505
(6) MEASURE GAGE LENGTH (IN)	99 1/2
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	

(9) INCREASE PRESSURE TO PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5490
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6250
(16) RECORD RULER READING AT FAILURE (IN)	6 9/16
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	10 3/8 FIXED END

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

c/c Break

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

~~WIRE~~ ~~TEST~~ GAGE #18

(1) TENDON IDENTIFICATION	79BF
(2) SAMPLE NUMBER	#1
(3) DATE WIRE TESTED	12.2.75
(4) DATA RECORDED BY:	H. S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 1/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	_____

(9) INCREASE PRESSURE TO 1500 PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790 _____
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	_____
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5520
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16"
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6700
(16) RECORD RULER READING AT FAILURE (IN)	7 5/16"
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	40 5/8"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

GAGE #18

(1) TENDON IDENTIFICATION	79 BF
(2) SAMPLE NUMBER	#2
(3) DATE WIRE TESTED	12.2.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.250
(6) MEASURE GAGE LENGTH (IN)	99 9/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	_____

(9) INCREASE PRESSURE TO 1500 PSIG*	1500
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	_____
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5650
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 9/16
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6720
(16) RECORD RULER READING AT FAILURE (IN)	7 1/16
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	9 7/16" FIXED END

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP- CONE BREAK

FIGURE C-5 TENDON WIRE TEST

PALISADES PLANT
FIVE YEAR TENDON SURVEILLANCE
TENDON WIRE TEST

GAGE # 4

(1) TENDON IDENTIFICATION	79 BF
(2) SAMPLE NUMBER	#3
(3) DATE WIRE TESTED	12.2.75
(4) DATA RECORDED BY:	H.S. GORAWSKI
(5) MEASURE WIRE DIAMETER (IN)	.2495
(6) MEASURE GAGE LENGTH (IN)	99 1/16
(7) CALCULATE 0.9% OF GAGE LENGTH (IN)	.896
(8) MEASURE DISTANCE - I.D. TAG TO RAM END OF SPECIMEN (IN)	_____

(9) INCREASE PRESSURE TO 1500 PSIG*	1500.
(10) ZERO LOAD	✓
(11) INCREASE PRESSURE TO 790 PSIG** AND SET DIAL INDICATOR AT 0.9% OF GAGE LENGTH	790
(12) INCREASE PRESSURE UNTIL DIAL INDICATOR SHOWS 0.00" EXTENSION. THIS IS THE 1% YIELD POINT PRESSURE	_____
(13) RECORD 1% YIELD POINT PRESSURE (PSI)	5810
(14) RECORD RULER READING AT 1% YIELD POINT (IN)	2 5/8"
(15) RECORD PRESSURE AT WIRE FAILURE (PSI)	6550
(16) RECORD RULER READING AT FAILURE (IN)	7 3/16"
(17) RECORD DISTANCE BETWEEN WIRE BREAK AND RAM END OF SPECIMEN	7 1/2"

*THE PRESSURE APPLIED IN STEP (9) SEATS THE STRESSING WASHER ONTO THE BH.

**THIS PRESSURE EQUALS 0.1% OF GAGE LENGTH (0.1% YIELD POINT PRESSURE).

CUP. CONE BREAK

FIGURE C-5 TENDON WIRE TEST

Wiss, Janney, Elstner and Associates, Inc.

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T. M. BROWN

December 8, 1975

Inland Ryerson Construction Products Co.
1560 N. 25th Avenue
Melrose Park, Illinois 60160

Attention: Mr. D. Waitkus
Mr. R. DeCheske

Re: Palisades Five Year
Tendon Surveillance
WJE No. 75563

Gentlemen:

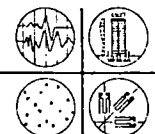
This letter will serve as our report covering tensile tests conducted on samples of 1/4 inch diameter prestressing wire submitted by Inland Ryerson Construction Products Company, Melrose Park, Illinois.

The samples had been removed from the Palisades Nuclear Plant for their five year tendon surveillance program. The samples were cut to length and tagged by Inryco personnel and brought to Wiss, Janney, Elstner and Associates, Inc. for testing. Tests were conducted on November 24 and 25, 1975 with a verbal report of the test results given to Mr. Waitkus on November 25, 1975.

The table below lists the test values obtained.

TABLE I
TENSILE TEST RESULTS

Test No.	Ultimate Load <u>Pounds</u>	Elongation <u>%(10" G.L.)</u>
Marked - 59 BD wire #3 - Buttonhead end of 48' section		
1.	13,100	5.2
2.	13,140	5.1



CONSULTING SPECIALISTS

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Wiss, Janney, Elstner and Associates, Inc.

Inland Ryerson Construction Products Co.
Attention: Mr. D. Waitkus
Mr. R. DeCheske

December 8, 1975
Page Two

Table I - cont.

Test No.	Ultimate Load <u>Pounds</u>	Elongation <u>%(10" G.L.)</u>
Marked - 59 BD wire #3 - cut from middle of 52' section		
1.	13,200	5.8
2.	13,080	5.6
Marked - 59 BD cut from broken end of 52' section		
1.	12,660	5.1
2.	12,280	5.3
3.	12,620	5.3

If there are any questions please let us know.

Respectfully submitted,

WISS, JANNEY, ELSTNER AND ASSOCIATES, INC.

Robert Krause

Robert Krause

RK:11

cc: H. Gorowski

Appendix H

Button Head Criteria 1610,

Inryco, Inc.

BUTTON HEAD CRITERIA 1610

INTRODUCTION:

The ultimate strength of wires with upset button heads, as used for the BBR Post-Tensioning method, depends on several factors. These are:

- Hardness of Base
- Dimensions of Bore Hole
- Head Dimensions
- Eccentricity
- Crack Influence

The stress relieved wire corresponding to ASTM A-421-65BA will give button heads which provide an anchor that will develop the ultimate strength of the wire as long as the standards established are met.

2. HARDNESS OF BASE:

For proper performance of the Inland-Ryerson button head, the material upon which it seats must have a Rockwell "C" hardness of 29 to 40. This hardness is accomplished and certified with an oil quench and tempering process, as well as hardness testing.

3. DIMENSIONS OF BORE HOLE:

For the most effective performance of the Inland-Ryerson button head the bore through the base material will be 0.260" to 0.270". The corners at the button bearing surface will be broken to a radius of 0.015". The corners at the opposite or feed end may be broken to a radius of 0.093" maximum.

4. HEAD DIMENSIONS:

A. Diameter:

The limits of the button head diameter are .366" minimum to .395" maximum diameter.

B. Height:

The limits of the button head height are .252" minimum to .272" maximum height.

5. ECCENTRICITY:

Eccentricities not noticeable with the bare eye are unimportant. Large eccentricities which are easily noticeable with the bare eye may lead to a premature fracture and must be avoided. It is imperative that the button head have a bearing surface on all sides. The bearing surface must be continuous and symmetrical about the wire axis within the established tolerance. Eccentricity of the button head from the axis of the wire shall not exceed 0.010".

6. CRACK INFLUENCE:

When upsetting certain steel wires, which otherwise have fully satisfactory properties, cracks become noticeable at the side of the head. The influence of these cracks is of little significance with respect to the button head developing the ultimate strength of the wire providing the following requirements are held:

- A. In no event shall two inclined splits occur in the same plane.
- B. The permissible opening of any one split between 30° to 45° with respect to wire axis is 0.002" maximum.
- C. The sum total of all splits or the opening of one split less than 30° shall not exceed 0.060".
- D. Splits shall not intersect.
- E. Slips which occur at approximately 45° are acceptable if open less than .002". If open greater than .002" it shall be considered a split with the applicable criteria applied.

A split is defined as a crack resulting from a defect in the wire. Normally, splits are oriented parallel to the axis of the wire.

A slip is defined as a shear crack resulting from excessive cold working. Slips are normally oriented at approximately 45° to the wire axis and will appear on both sides of the button head.

APPENDIX I

Failure Analysis of Tendon Wire,
Containment Building Post-Tensioning System.

BECHTEL CORPORATION
San Francisco, California

DATE: January 8, 1976

Project No. 10512-018, Palisades Nuclear Plant
Title: Investigation of Failed Wire from Tendon 59BD
Supplier: Armco Steel Co.
Prepared For: G. F. Cochrane, Engineering Specialist
By:

R. S. Moser
R. S. Moser, Senior Engineer
Materials and Quality Services

Approved By:

R. C. Bertossa
R. C. Bertossa
Metallurgical Engineering Group Manager
Materials and Quality Services

Approved By:

W. R. Smith, Sr.
W. R. Smith, Sr.
Manager
Materials and Quality Services

INDEX OF ILLUSTRATIONS

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FIGURE 3 Scanning Electron Fractographs	7
FIGURE 4 Service Fracture, Side View	8
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ABSTRACT

This report covers the metallographic investigation by the Materials and Quality Services Department of the failure of one wire from tendon 59BD of the Palisades Nuclear Plant containment structure.

The results of the investigation indicate that the wire failed in tension due to a material defect. There was no indication of an environmental contribution to the failure.

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I INTRODUCTION

A failed wire from tendon 59BD of Palisades Nuclear Plant containment structure was discovered during the 1975 tendon surveillance program. The end of the wire close to the break was reported to be sticking out approximately 3/4 of an inch from the stressing washer on removal of the grease cap. The actual time of failure of the wire, which had been installed in 1969, is not documented.

The purpose of this investigation is to determine the cause of failure, particularly to examine for indications of environmental effects, material defects, or simple tensile overload.

II SUMMARY AND CONCLUSION

This investigation documents grain boundary fractures and low tensile properties developed by tensile specimens in the vicinity of the service failure. These two observations are related and both contributed significantly to the failure of the tendon wire. No indications of environment related mechanisms such as corrosion or stress-corrosion, or incorrect installation procedures were apparent.

The results of this investigation indicate that the tendon wire failed due to material defects while under a tensile load.

III RECOMMENDATIONS

Since there is no indication that the service environment contributed to the failure, there are no specific recommendations that can be made for additional protection of remaining wires.

IV MATERIALS

The tendon wire was purchased to ASTM Specification A421 "Uncoated Stress-Relieved Wire for Prestressed Concrete".

V PROCEDURE

Specimens

Four pairs of tendon wire specimens, each pair representing one tensile fracture, were submitted for examination. Three of the four pairs were from tensile tests performed on the failed wire. The fourth pair included the fracture that occurred in service (service fracture).

Seven additional specimens from the failed wire had also been tensile tested. Fractured specimens from these tests were not submitted. One additional tensile test (specimen No. 11) from a location adjacent to the service failure was performed by M&QS.

Test Results

A sketch of the failed wire, which shows the relative locations of the above samples, is provided in Figure 1. Results of tensile tests, which are recorded in Table I, reveal a marked decrease of ultimate tensile strength (Specimens Nos. 3 and 11) adjacent to the service failure.

Visual Examination

Visual examination of the tensile test specimens revealed the characteristic ductile cup and cone fracture surfaces with the exception of specimen No. 11. The flat areas of specimen No. 11 and the service fracture are off-centered in contrast to the circular centered flat area of the three "good" tensile specimens. The fracture surfaces are shown in Figure 2.

The service fracture surfaces contained mating areas which exhibited temper colors ranging from straw to blue. This area is visible in Figures 2(c) and 4 as a dark zone. The existence of temper colors on the fracture surface indicates the presence of a crack during the final tempering or stress-relieving heat treatment.

The crack visible in Figure 5, located approximately 1 inch from the service fracture, had propagated on a 45 degree angle to a depth of 0.03 inch.

Metallographic Examination

Mounted and polished specimens were prepared from the service fracture and from tensile specimen No. 1 to expose longitudinal sections through the fracture surfaces for metallographic examination. Figure 6(b), 7 and 8 are from the service fracture specimen at increasing magnifications to show voids and grain boundary fractures in the vicinity of the main fracture. The voids are spaces believed to have been occupied by grains encircled by fractured boundaries that fell out during polishing of this section. A similar examination of tensile specimen No. 1 indicated it to be free of such imperfections.

Scanning electron micrographs from flat areas of tensile specimen No. 1 and from the service fracture are shown in Figure 3. These show primarily a dimpled fracture surface, which is characteristic for ductile tensile fractures, with some cleavage areas. Examination of the 45 degree surfaces showed a dimpled structure.

VI

DISCUSSION

Tensile tests from various locations along the length of tendon wire demonstrate a marked variation in tensile strength. The two lowest values, below the minimum specified strength, were obtained from specimens removed from the vicinity of the service fracture. Results of the remaining nine tensile test exceeded the minimum specified tensile properties.

The embrittled grain boundaries, apparently limited to a length of wire adjacent to the service fracture, degraded the wire's tensile properties. This, in addition to the precrack, resulted in the wire failure under the influence of an applied load, presumably during installation.

The specific cause of the precrack, a manufacturing defect, has not been pursued in the course of this investigation, although it is likely related to the inferior grain boundary properties. No indication of a time dependent fracture mechanism was evident on examination of the fracture surface. The wire, therefore, is believed to have failed by the application of a single load during post tensioning of the tendon. Its failure may have gone undetected if it had broken, as the evidence indicates, at a stress significantly lower than the specified minimum required tensile strength.

VII

ACKNOWLEDGEMENTS

The author appreciates the metallographic efforts contributed by P. K. Lee.

TABLE I

Tensile Test Results

Sample No.	Ultimate Stress KSI	Yield Stress KSI (1% elong)	Elongation %	Sample Length inch
1	255	215	4.5	99 9/16
2	257	212	6.1	99 $\frac{1}{2}$
3	228	200	5.0	99 $\frac{1}{2}$
4	267	-	5.1	10
5	268	-	5.2	10
6	269	-	5.8	10
7	266	-	5.6	10
8	258	-	5.1	10
9	257	-	5.3	10
10	250	-	-	10
11	212	-	-	10
ASTM A-421 Tensile Req.	240	192	4.0	

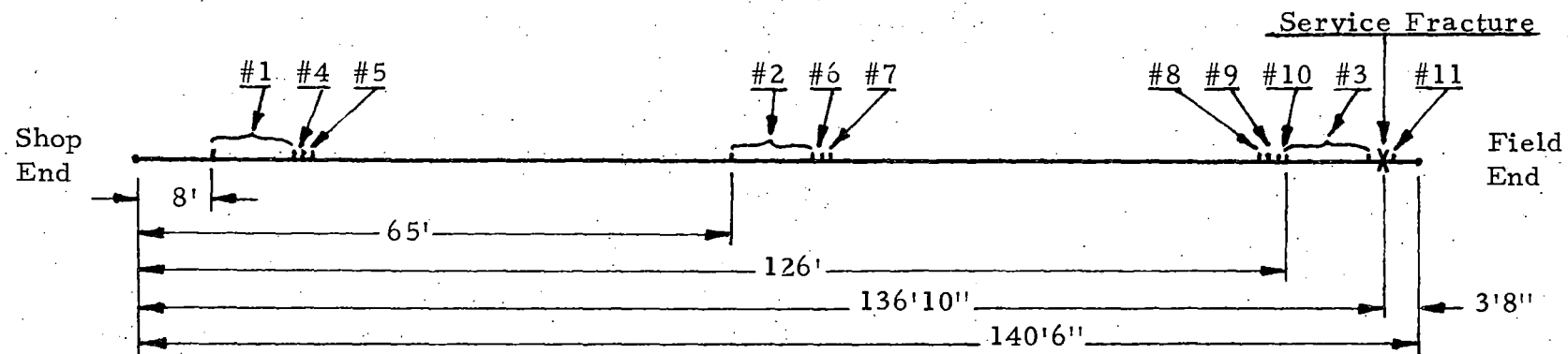
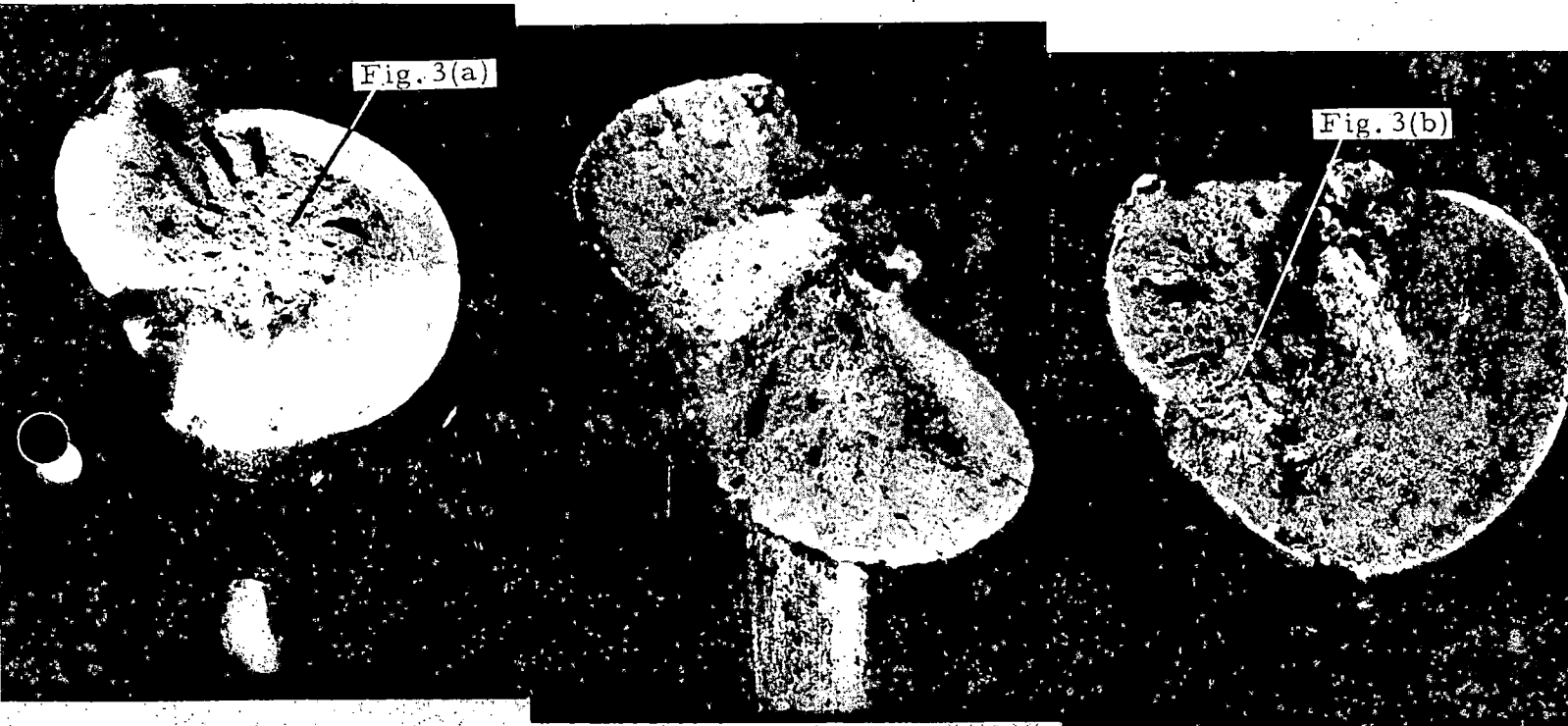


FIGURE 1

Map of failed tendon wire showing
location of eleven tensile specimens
and the service fracture.



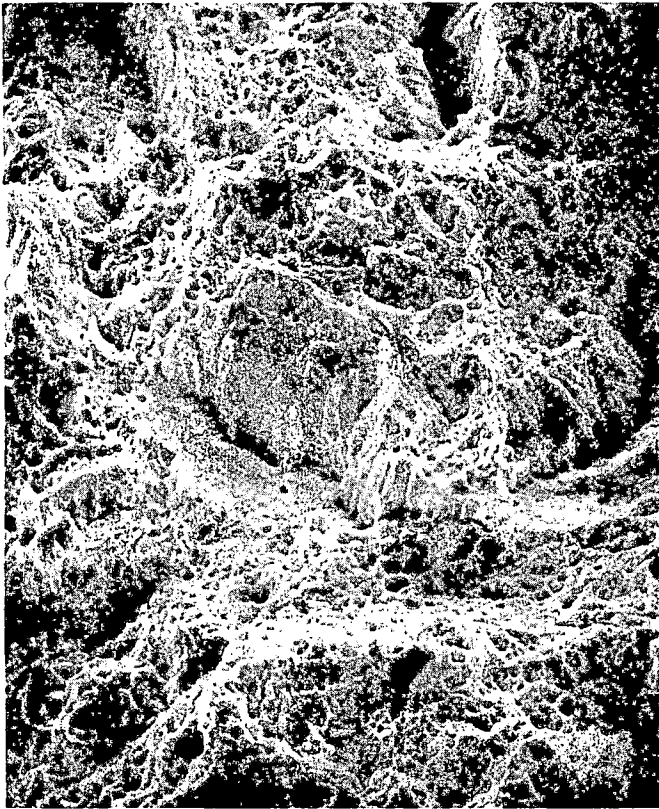
(a) MAG. 10X

(b) MAG. 10X

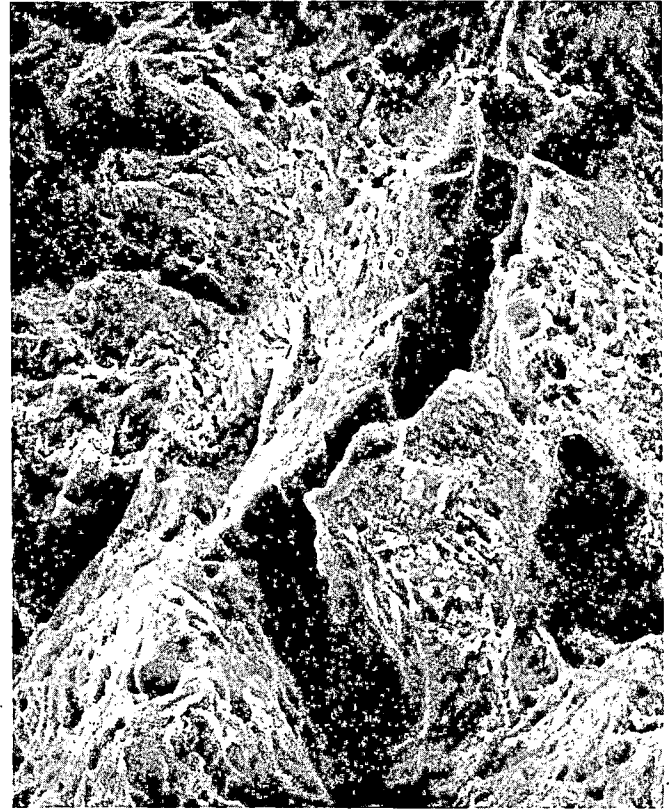
(c) MAG. 10X

FIGURE 2 Fracture Surfaces

- (a) Tensile test sample No. 1. Cup-and-cone fracture characteristic of ductile materials.
- (b) Tensile test sample No. 11. Off centered flat area.
- (c) Service break. Off centered flat area.



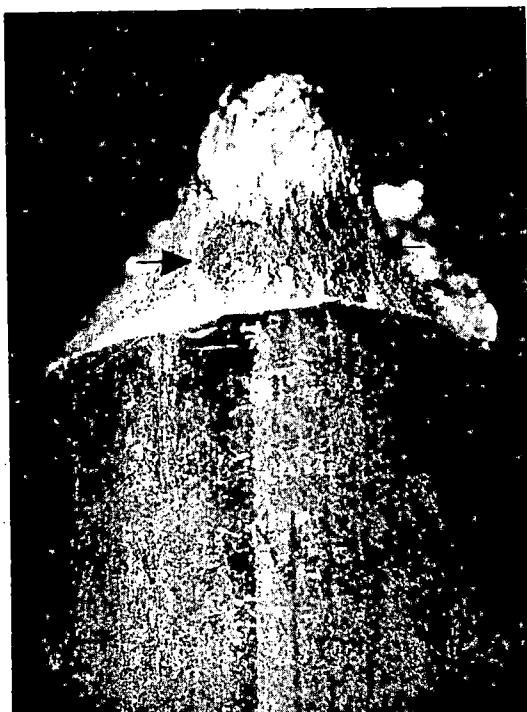
(a) MAG. 1000X



(b) MAG. 1000X

FIGURE 3 Scanning electron fractographs of fracture surfaces, both consist primarily of dimple fracture.

- (a) from flat area of tensile test sample No. 1.
- (b) from flat area of service failure.



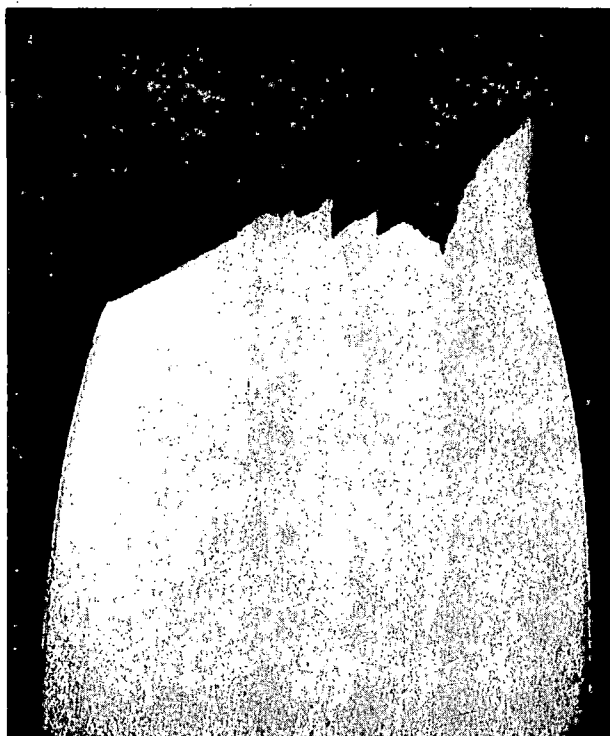
MAG. 10X

FIGURE 4 Service fracture.
Temper color between two arrows
visible on fracture cone.

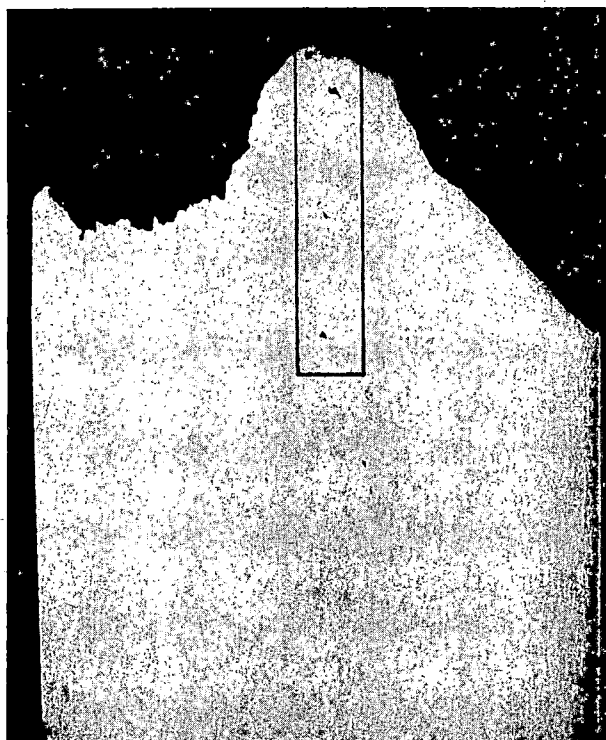


MAG. 10X

FIGURE 5 Shallow crack approx.
1 inch from service fracture.



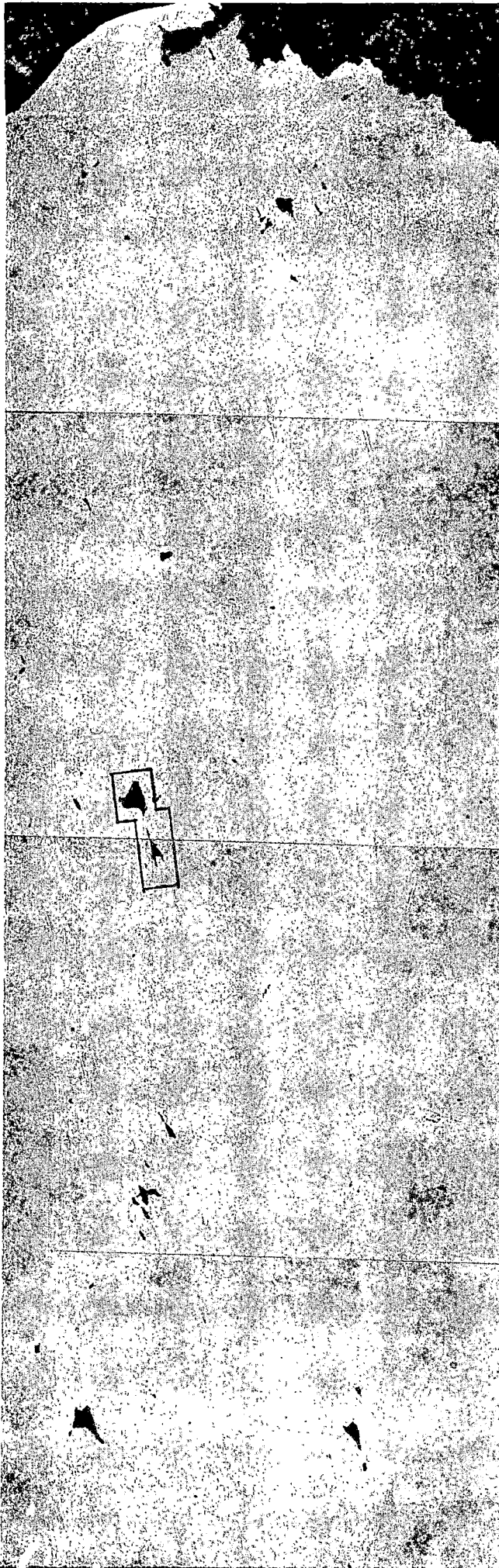
(a) MAG. 12X



(b) MAG. 12X

FIGURE 6 Longitudinal Sections through

- (a) tensile test No. 1 fracture, and
(b) service fracture.



Fracture profile

FIGURE 7 Higher magnification of area marked in Figure 6. Numerous voids are visible.

MAG. 75X

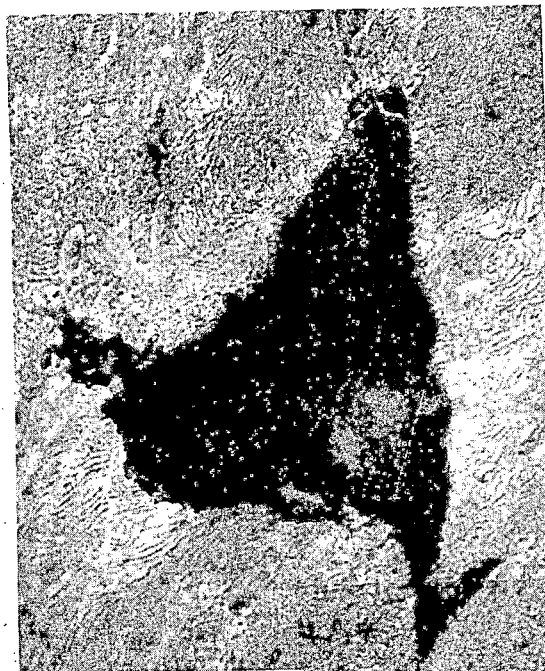


FIGURE 8 Selected area
from Figure 7. Grain boundary
separation and voids are visible.

MAG. 1000X

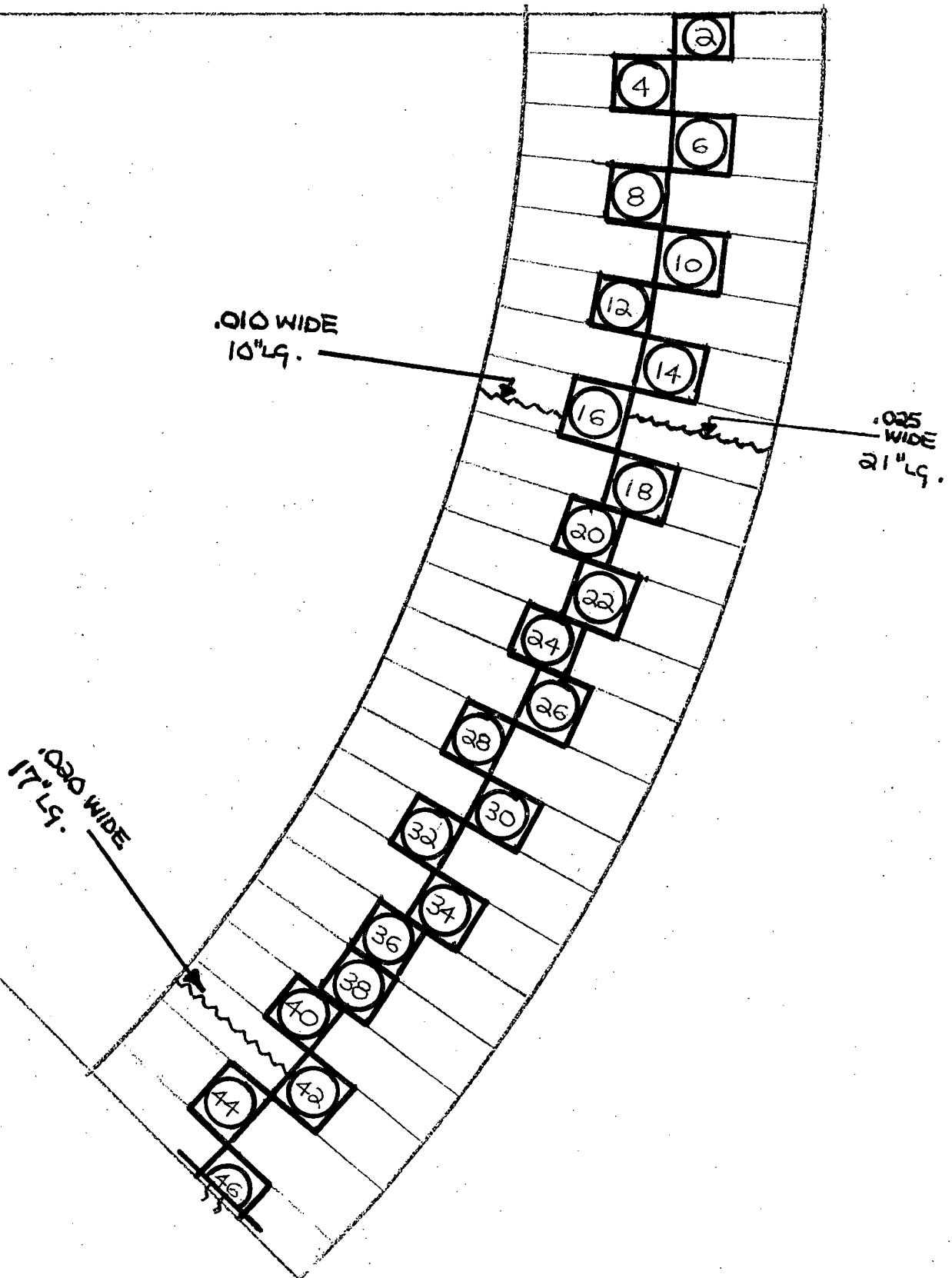


APPENDIX J

Crack Maps of Tendon Gallery.

INRYCO, INC.
Box 1056, 1560 North 25th Avenue,
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312-379-9600

Post Tensioning Division

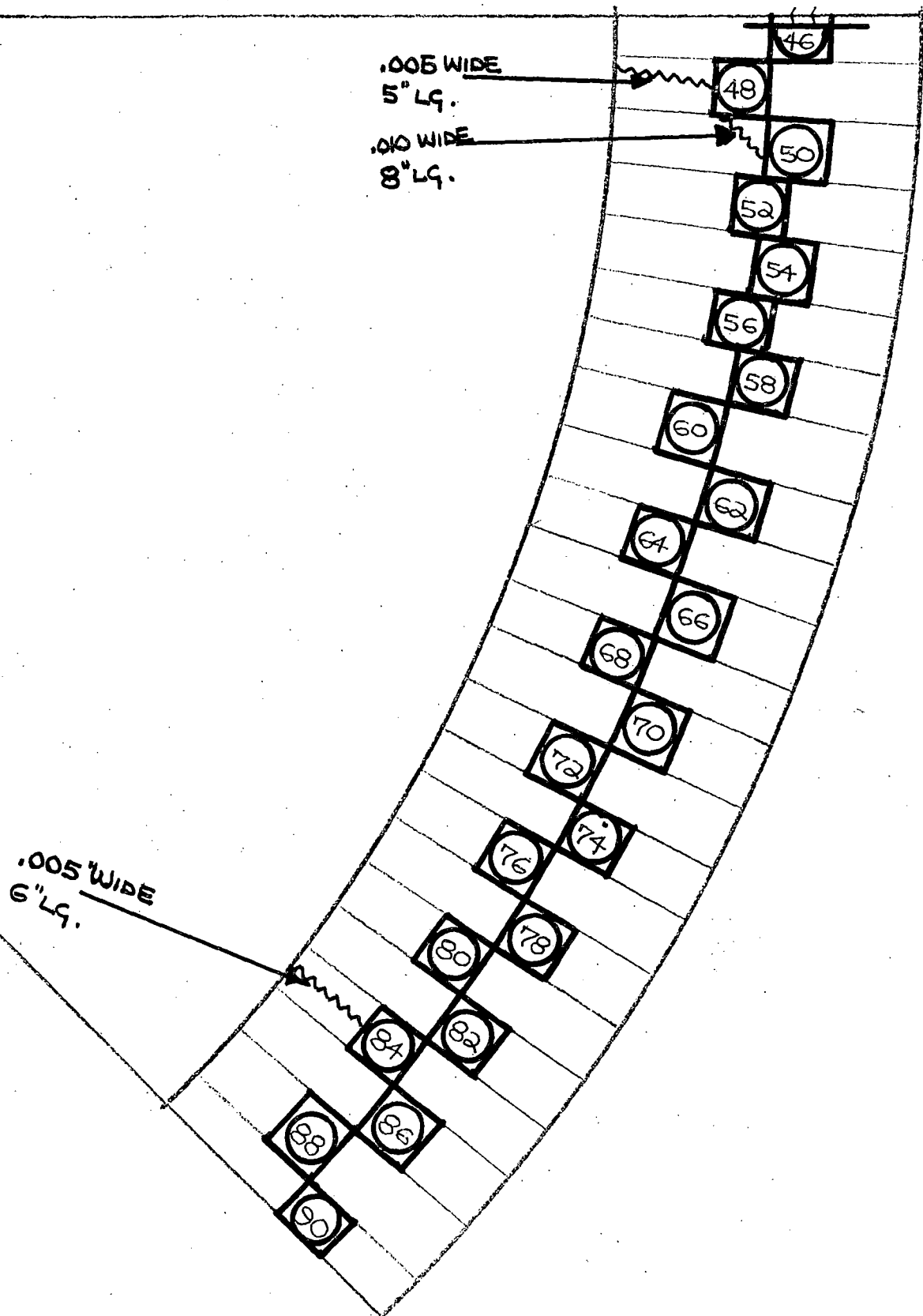


CRACKS IN GALLERY AREA

R. KRUPICKA 12-19-75

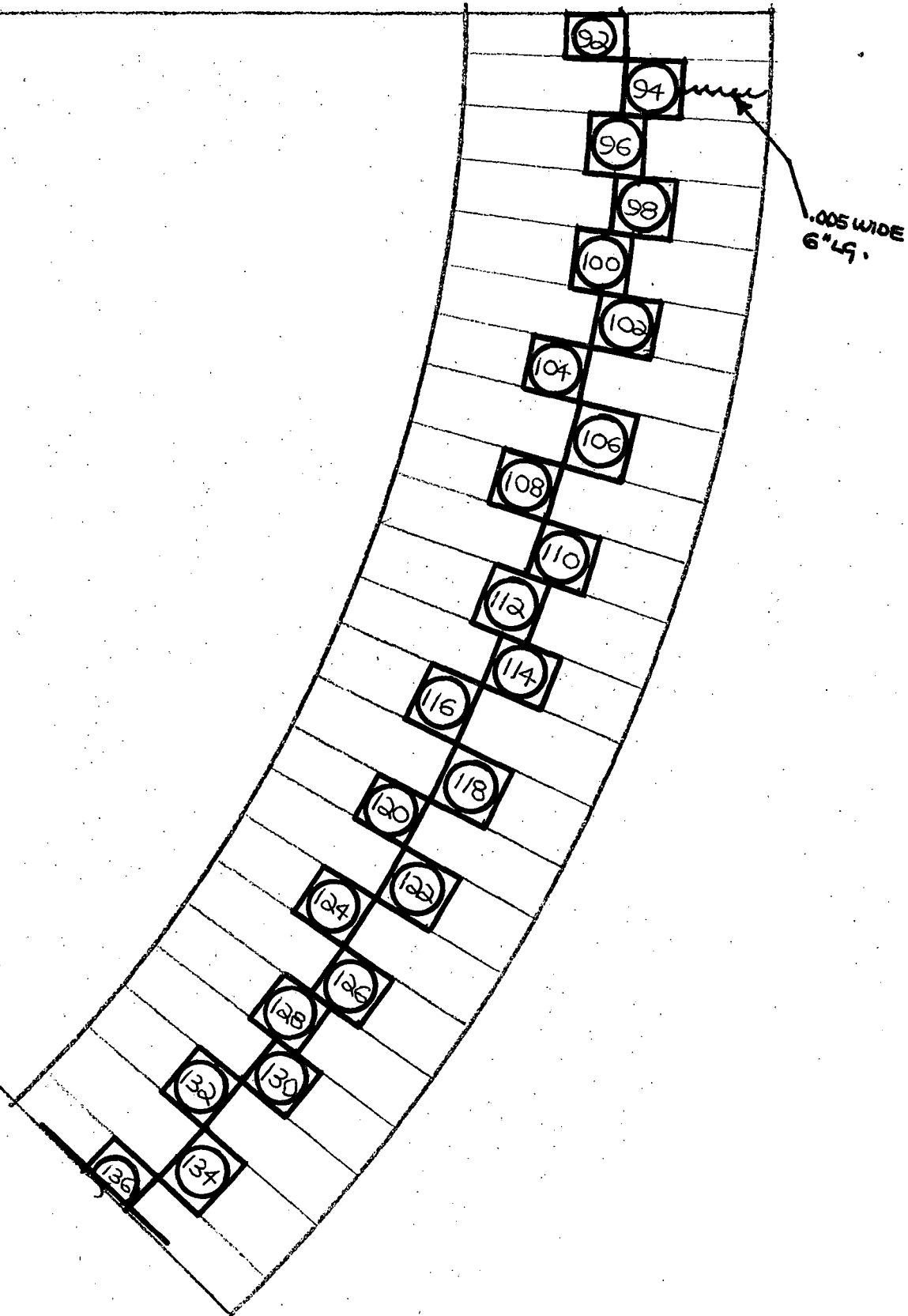
INRYCO, INC.
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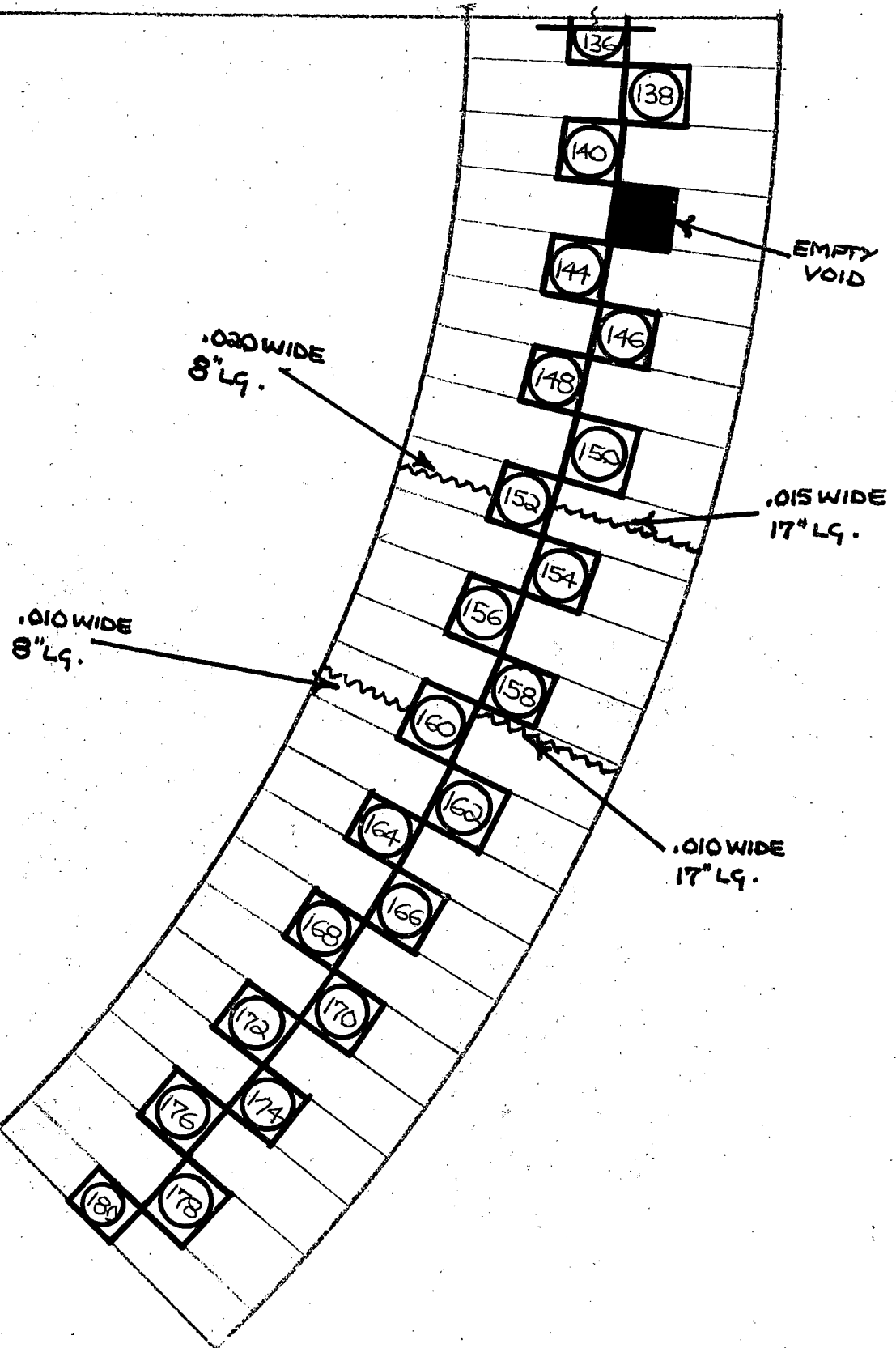
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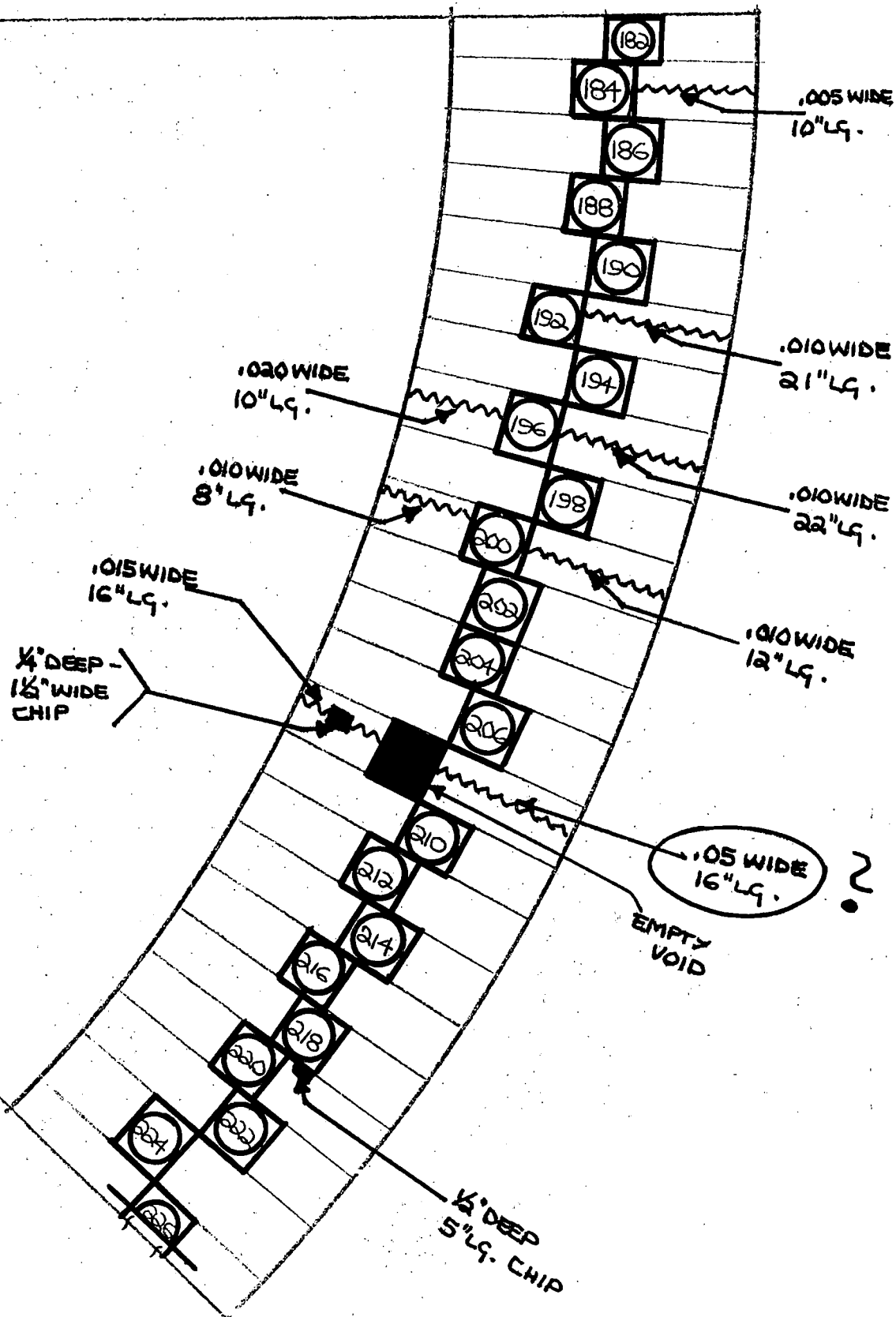
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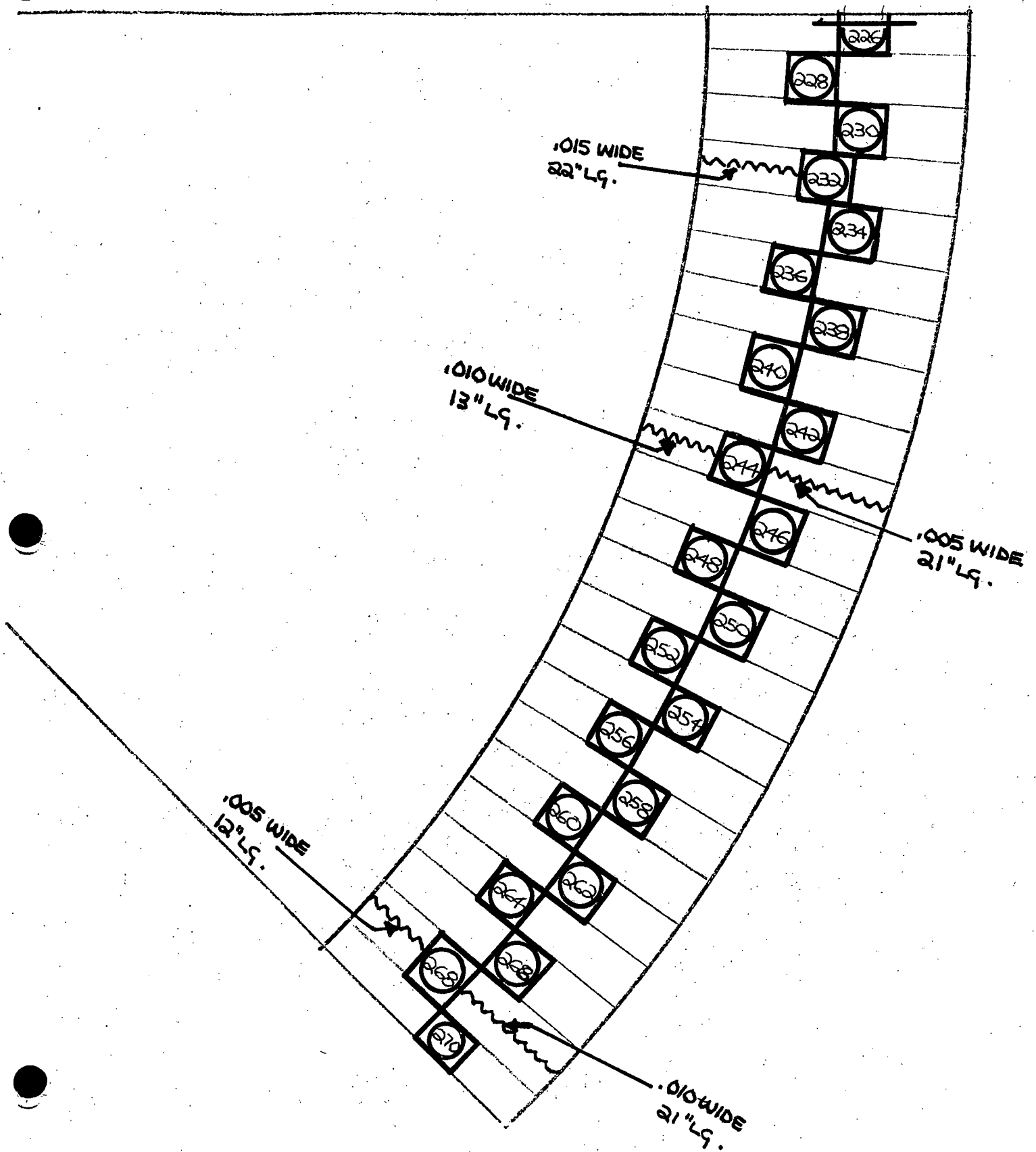
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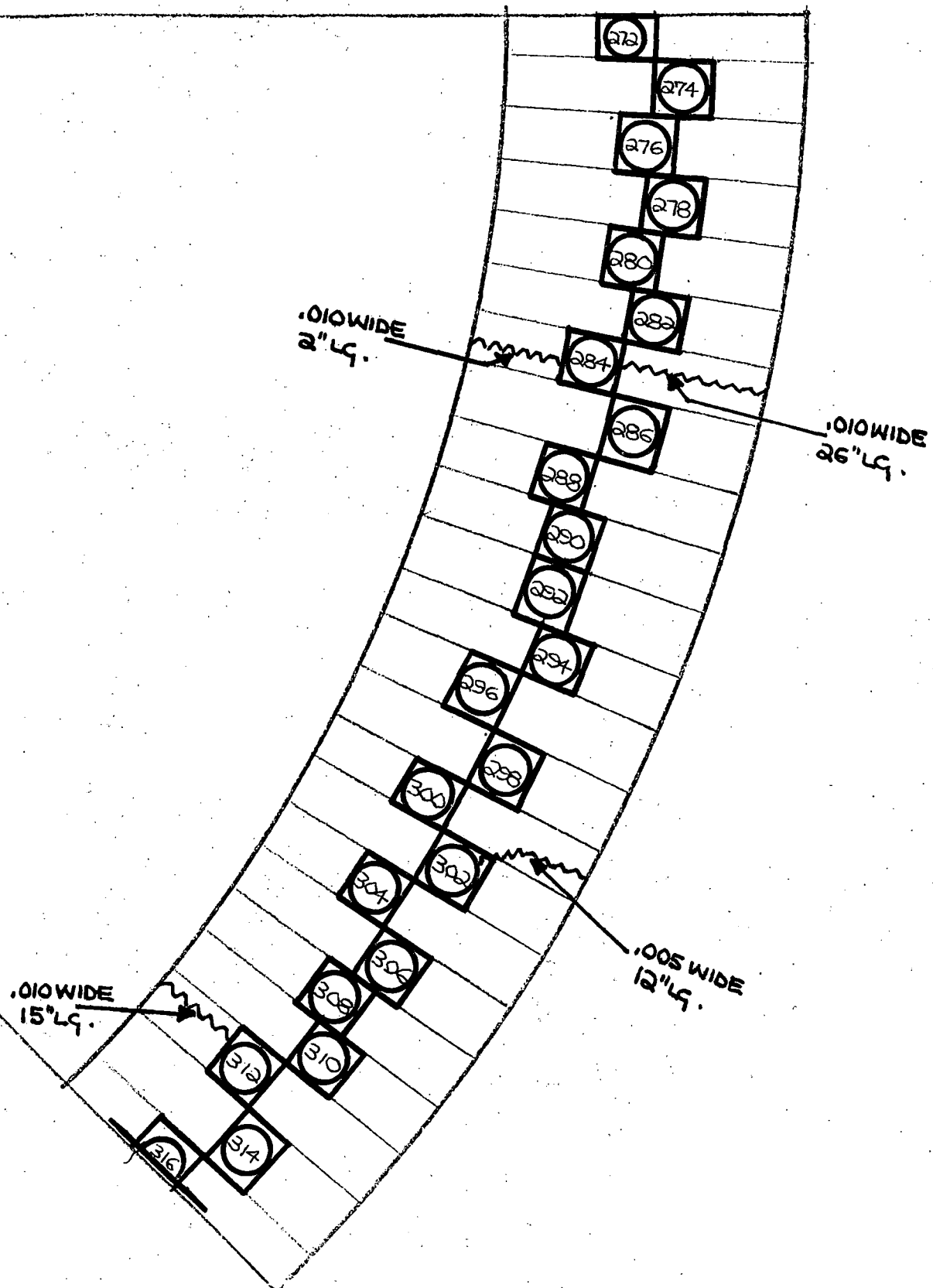


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