SUBJECT CODE	SOUTH CAROLINA ELECTRIC AND GAS COMPANY CALCULATION RECORD	PAGE
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CALC TITLE	CALC NO.	REV	STAT
RB TENDON HOOP AND DOME LOSS CALCULATIONS FOR 5TH PERIOD SURVEILLANCE	DC03050-001	0	I

PARENT DOCUMENT	SYSTEM	SAFETY CLASS	CALC. CLASS
STP0160.001	BS	NN QR [SR]	[I] II III IV V VI

ORIGINATOR	DISC	ORGANIZATION	DATE	XREF NO.
KRAUSE, D.	CS		10/13/95	NONE

A. CALCULATION INFORMATION

CONTENT DESCRIPTION:

THIS CALCULATION IDENTIFIES THE RB TENDON FORCE LOSSES AND THE SURVEILLANCE ACCEPTACE CRITERIA FOR THE DOME AND HOOP TENDONS.

AFFECTED COMPONENTS/ANALYSIS: 11/1/10/96

RB TENDONS D111, D112, D113, D225, D226, D227, D324, D325, D326, 12AC, 13AC, 14AC, 29CB, 30CB, 31CB, 42BA, 43BA, 44BA

CONTAINS PRELIMINARY DATA/ASSUMPTIONS:

[X] NO [ ] YES, PAGES

FOR INFORMATION ONLY

COMPUTER PROGRAM USED: [ ] NO

[ ] YES, VALIDATION NOT REQ'D. [REF. 3.5]
[X] YES, VALIDATED [ES-412]
[ ] YES, VALIDATED [OTHERS]
[ ] PROGRAM VALIDATION CALCULATION

B. VERIFICATION

VERIFICATION SCOPE

VERIFY CALCULATION METHODOLOGY, INPUT AND ASSUMPTIONS. PERFORM SPOT CHECK OF MATH.

VERIFIER: PARSONS, G.

ASSIGN BY: WHORTON, R. B.

Greg Parsons FOR DALE KRAUSE 1/8/96
LEAD ENGINEER (DESIGNEE)/DATE

VERIFIER / DATE	APPROVAL / DATE
Greg Parsons 1/8/96	RB Whorton 1-8-96

C. RECORDS

TO PRS: _____
INIT/DATE

REEL NUMBER:

FRAME NUMBER:

ORIGINAL MAINTAINED BY:

SCE&G DE

DISTRIBUTION: CALC FILE [ORIGINAL]
DSE _____ /SYSTEM ENG _____ /DE FILE 20.6602 [ATTACH. 1 ONLY, COPY]

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PDR ADOCK 05000395
P PDR

SOUTH CAROLINA ELECTRIC & GAS COMPANY REVISION SUMMARY	PAGE 2 OF 21

CALCULATION NO.
DC03050-001

REV NO.	SUMMARY DESCRIPTION
0	This calculation identifies the predicted forces and acceptance criteria for the RB horizontal and dome tendons that were selected for the fifth period surveillance and the adjacent tendons.

☐ CONTINUES ON PAGE

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TECHNICAL WORK RECORD

Serial 10606
Engineer G. Parsons
Date 1/8/96
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Project Title RB Horizontal & Dome Tendon Force

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VERIFIER'S COMMENTS

The purpose of this TWR is to document the verification performed on DC03050-001 Rev. 0. The verifier has reviewed the calculation methodology, the inputs and the assumptions. A spot check of the math was also performed. This calculation identifies the predicted forces and acceptance criteria for the RB tendons that were selected for the fifth period surveillance.

Previous tendon force predictions were based on subtracting a series of estimated force loss factors from the original lock-off force value. This calculation method replaces these estimated values with graphically derived values. The graphically derived values are extrapolated from previous surveillance data. This is a more accurate way of deriving the predicted forces since it more accurately defines the unknowns affecting these particular tendons. The calculation inputs include time of original lock-off, original lock-off force, Normalization factors ect.. These values were obtained from previously verified documents and are reasonable and accurate for this application. The primary assumption in this calculation is that if the tendon force vs time is plotted on a semi-log plot, the data points will form a straight line. This assumption is reasonable and is shown to be accurate based on previous tendon force data.

Figure 2-1 Dome Tendons Force-Time Curve
(Average Of Normalized Surveillance Forces)

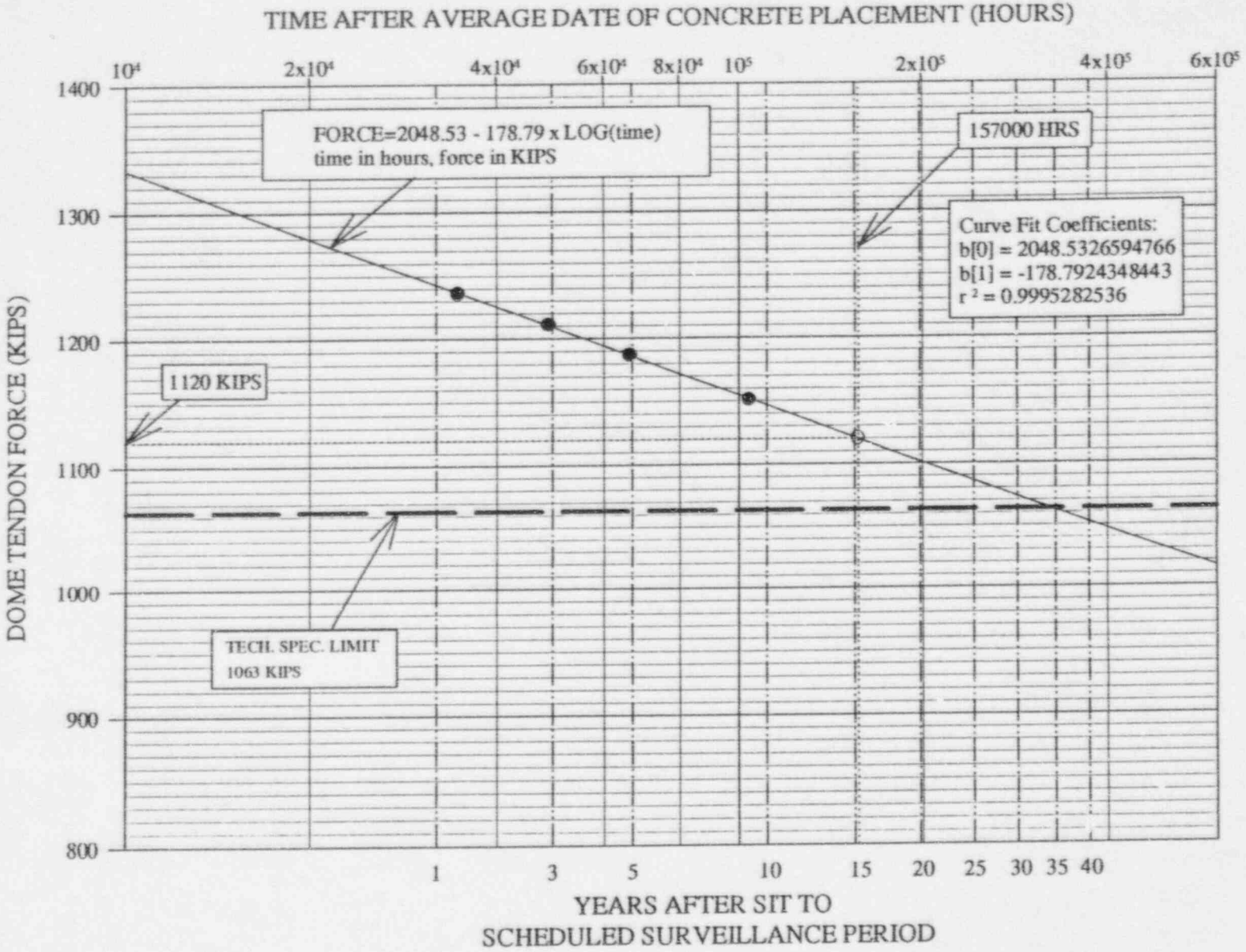

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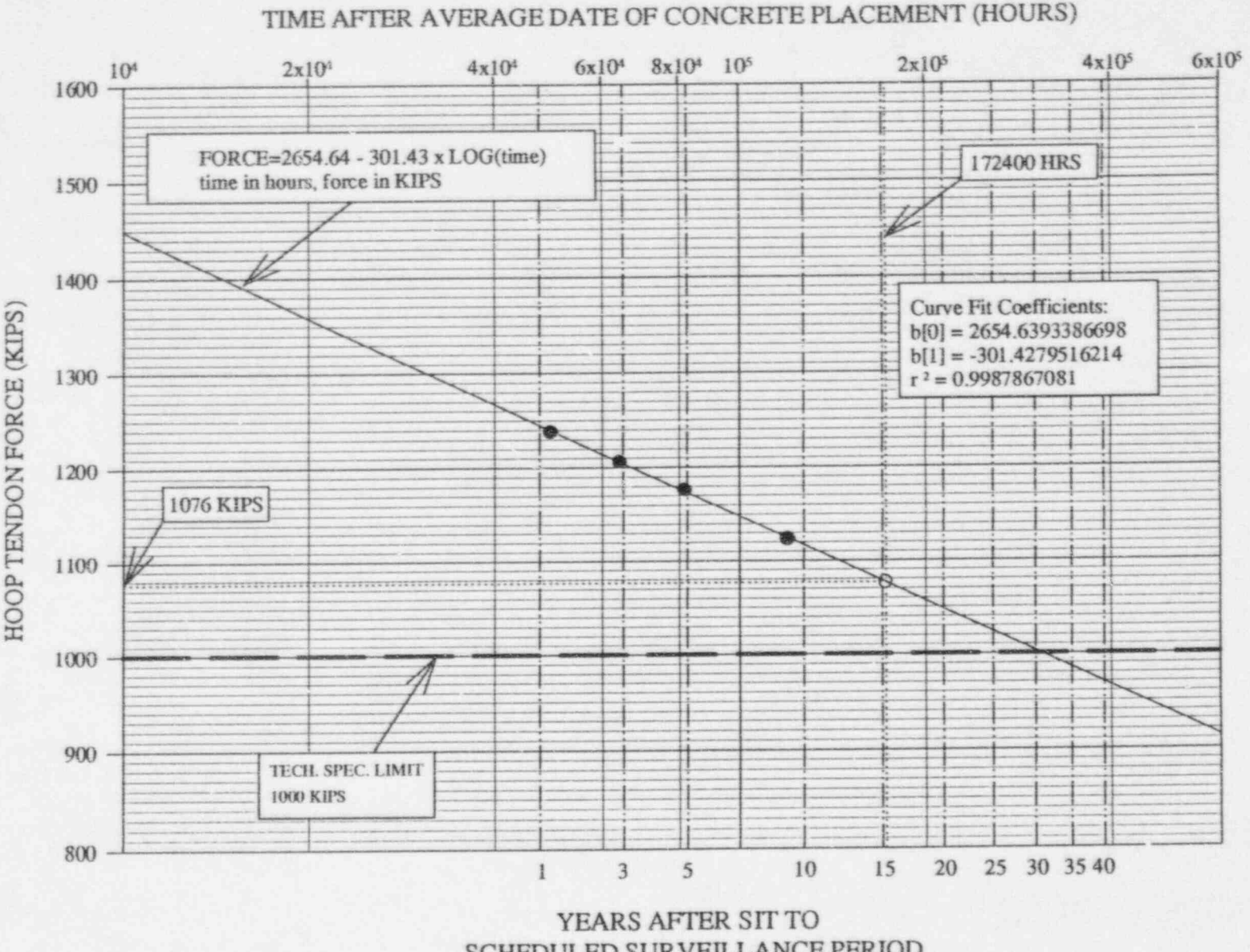
Figure 2-2 Hoop Tendons Force-Time Curve
(Average Of Normalized Surveillance Forces)



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ENGINEERS
TECHNICAL WORK RECORD

Serial
Engineer D.Krause
Date 10-13-95
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Project Title **Predicted Force - Hoop and Dome Tendons**

File ID : A:\TENDON6.DOC

1.0 OBJECTIVES

(1) Develop general methodology for predicted liftoff force for the hoop and dome tendons by using the results from previous surveillances, i.e. a traditional approach based on experience.

(2) Develop the predicted liftoff forces for the hoop and dome tendons for the 5th tendon surveillance (15 years after SIT) planned for April 1996 using the traditional approach.

1.1 DESIGN INPUTS

1.1.1 The design inputs consist primarily of previous V.C.Summer Station structural calculations. These are clearly referenced where they are referenced in the body of the calculation.

1.1.2 Other documents referred to in the calculations include:

(1) SP 228 Surveillance of the Reactor Building Post Tensioning System.

(2) Reactor Building Containment Fourth Period Surveillance Tendon Forces Report, May 1990.

1.2 ASSUMPTIONS

Assumptions are identified in the calculation where used. There are no assumptions requiring future confirmation.

1.3 COMPUTER USE

The software SigmaPlot for Windows by Jandel Corp. is used to plot the graphs of the data points of group average forces from each surveillance to obtain the force vs. time trend for each group of tendons. The data is also plotted manually on semilog graph paper to verify the results using SigmaPlot.

1.4 CALCULATION

The basic sequence of steps to determine predicted liftoff forces using the traditional approach are:

1. Develop the current Group Average Normalized Tendon Force vs. Time graph for each group of tendons.

The curve for each group consists of a straight line fit through the data points for each of the surveillances performed to date. Each data point represents the average of the normalized forces for the tendons in each group for a particular surveillance. The curves are plotted on a semilogarithmic graph where the force losses versus time are essentially linear over the 40 year plant design life.

SigmaPlot software is used to generate the plots for the dome and hoop tendons, attached as Figures 2-1 and 2-2. The manually drawn graphs on pages 15 & 16 confirm the accuracy of the SigmaPlot software graphs.

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2. Obtain the tendon force corresponding to the intersection of the time of the surveillance of interest and the straight-line projection of group average force versus time results from previous surveillances.

Figures 2.1 and 2.2 are used to demonstrate the method for the dome and hoop tendon groups for the 5th tendon surveillance period.

The time durations from concrete placement to the planned surveillances are given in Table 1 below. Although the difference is minor, the time may be calculated for the actual planned start of the particular surveillance as described below for the 15 year surveillance scheduled to begin on approximately April 1,1996.

As the time since the performance of the SIT increases, the predicted tendon liftoff force becomes less sensitive to the actual time of the surveillance because the losses occur at a logarithmically decreasing rate over time. The majority of the losses occurred in the years immediately following stressing. For example, the hoop tendons at the 15 year surveillance are experiencing losses at the rate of about 0.45 kips per month. At the 20 year surveillance, losses will be occurring at the rate of about 0.3 kips per month. Therefore, an estimate of the time within 6 months of the actual surveillance for use in determining the predicted liftoff forces for the 15 and 20 year surveillances will provide an accuracy better than 3 kips. An accuracy of 3 kips is acceptable and conservative. For perspective, 3 kips represents about 0.27% of the force in the tendon for a tendon having 1100 kips of force.

These conclusions for the hoop tendons also apply to the dome tendons because the hoop tendons are experiencing losses at a faster rate than the dome tendons as shown by a comparison of the slopes of the group force versus time curves (Figures 2-1 and 2-2) for the surveillances completed to date.

For the 25 year, and beyond, surveillances, the use of a time corresponding to the year of the surveillance to determine the predicted force will provide an accuracy better than 3 kips.

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Project Title Predicted Force - Hoop and Dome Tendons

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TABLE 1 PLANNED TIME FROM CONCRETE PLACEMENT TO SURVEILLANCE

	YEAR	VERTICAL DAYS	VERTICAL HOURS	HOOP DAYS	HOOP HOURS	DOME DAYS	DOME HOURS
SIT	JAN 1,1981	1,612	38,688	1,612	38,688	969	23,256
1 YEAR	JAN 1,1982	1,977	47,448	1,977	47,448	1,334	32,016
3 YEAR	JAN 1,1984	2,707	64,968	2,707	64,968	2,064	49,536
5 YEAR	JAN 1,1986	3,438	82,512	3,438	82,512	2,795	67,080
10 YEAR	JAN 1,1991	5,265	126,360	5,265	126,360	4,622	110,928
15 YEAR	JAN 1,1996	7,091	170,184	7,091	170,184	6,448	154,752
20 YEAR	JAN 1,2001	8,918	214,032	8,918	214,032	8,275	198,600
25 YEAR	JAN 1,2006	10,744	257,856	10,744	257,856	10,101	242,424
30 YEAR	JAN 1,2011	12,570	301,680	12,570	301,680	11,927	286,248
35 YEAR	JAN 1,2016	14,396	345,504	14,396	345,504	13,753	330,072
40 YEAR	JAN 1,2021	16,223	389,352	16,223	389,352	15,580	373,920

Reference: V.C.Summer Station Structural Calculation Book Z-3D 1 18.3, pages 156 and 157.

Example calculation of dome and hoop group average tendon force for 15 year surveillance (5th surveillance):

Planned start of surveillance: April 1, 1996

Total hours in January, February, and March 1996 =
= (2 mo. x 31 days/mo. + 28 days) x 24 hr/day = 2,160 hours

Add 2160 hours to the hours for January 1, 1996 shown in Table 1:

Vertical and Hoop = 170,184 hours + 2,160 hours = 172,344 hours (172,400 hours)

Dome = 154,752 hours + 2,160 hours = 156,912 hours (157,000 hours)

Enter the rounded off hours in the SigmaPlot files for the Dome and Hoop tendon groups respectively and determine the group average force corresponding to the intersection of the hours and the straight line projection of the group average curve.

The predicted group average forces at 15 year surveillance are:

Figure 2-1 Dome Group Average Force = 1120 kips

Figure 2-2 Hoop Group Average Force = 1076 kips

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Project Title **Predicted Force - Hoop and Dome Tendons**

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3. Calculate the predicted liftoff forces for the individual selected and adjacent tendons.

The predicted liftoff force is obtained by ***subtracting*** algebraically the normalization factor for the particular tendon from the predicted group average of the normalized forces for the particular surveillance. The tendon normalization factors are obtained from Table 5 (Enclosure 8) of the current revision of SP 228 "Surveillance of Reactor Building Post-tensioning System". Normalization factors may be calculated for tendons not previously selected using the methodology in V.C.Summer Station Structural Calculation Book Z4-K, 1:18.5, starting on page 98. This calculation for normalization factors may be performed manually or by computer using a spreadsheet.

4. Tendon group average liftoff force data .

The data used to develop the group average force versus time plots in attached Figures 2-1 and 2-2 is shown on Tables 2 and 3 below.

The predicted liftoff forces (Base Values) for the selected and adjacent tendons for the 5th period (15 year) surveillance calculated by the traditional approach are shown in Table 4.

TABLE 2 - ACTUAL TIME FROM TENDON CONCRETE PLACEMENT TO TENDON SURVEILLANCE

TENDON GROUP	SURV. NUMBER	PLANNED SURV. DATE	(1) CONC. PLACING TO PLANNED SURV. DATE (HRS)	EFFECTIVE SURV. DATE	(2) DELTA PLANNED TO EFFECT. SURV. DATE (HRS)	(1)+(2) CONC. PLACING TO EFFECT. SURV. DATE (HRS)
HOOP	1	Jan.1,1982	47,448	Mar 31, 1982	+2160	49,608
	2	Jan.1,1984	64,968	Nov. 30, 1983	-744	64,224
	3	Jan.1,1986	82,512	Nov..30,1985	-720	81,792
	4	Jan.1,1991	126,360	Feb. 28, 1990	-7080	119,280
DOME	1	Jan.1,1982	32,016	Apr. 20, 1982	+2640	34,656
	2	Jan.1,1984	49,536	Nov. 30, 1983	-744	48,792
	3	Jan.1,1986	67,080	Nov. 30,1985	-720	66,360
	4	Jan.1,1991	110,928	Feb. 28, 1990	-7080	103,848

REFERENCES:
1. V.C.Summer Structural Calculations Book Z-3D. calculation 1:18.3, pages 156, 157 for planned surveillance dates and hours from concrete placement to planned surveillance dates.
2. Individual reports for each of surveillances for effective surveillance dates.

NOTES:
1. It is sufficiently accurate to use as the effective date of the surveillance either the approximate midpoint of the actual surveillance work (preferred) or the approximate beginning of the surveillance work. The difference between the two is typically about one month.

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Project Title Predicted Force - Hoop and Dome Tendons

File ID : A:\TENDON6.DOC

TABLE 3 - AVERAGE OF THE NORMALIZED TENDON LIFTOFF FORCES

SURVEILLANCE NUMBER.	HOOP TENDON GROUP (KIPS)	DOME TENDON GROUP (KIPS)	SOURCE
1	1238	1236	TABLE 5, 3RD PERIOD SURV. REPORT
2	1206	1211	TABLE 5, 3RD PERIOD SURV. REPORT
3	1176	1187	TABLE 1, 3RD PERIOD SURV. REPORT
4	1123	1151	TABLES 2-2 AND 2-3, 4TH PERIOD SURV. REPORT

REFERENCE:
V.C.Summer Station Structural Calculation Book Z - 4H, pages 237 to 240.

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Engineer D.Krause
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Project Title **Predicted Force - Hoop and Dome Tendons**

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1.5 RESULTS

1. The results of this calculation are shown in Table 4. Table 4 provides the Base Value predicted liftoff force for the selected and adjacent hoop and dome tendons for the 5th tendon surveillance scheduled for April 1996. The values for 0.95 Base and 0.90 Base are also shown. The same approach can be used for the liftoff force prediction for hoop and dome tendons for the surveillances beyond the 5th surveillances.

2. When calculating the predicted liftoff forces for a given surveillance, it is recommended that the data point for the normalized group average liftoff force for the tendons in a group from the previous surveillance be added to the plot of data from all previous surveillances and the best fit straight line be reconstructed through all the available data points. This means that a calculation to determine predicted liftoff forces for each surveillance will be done at any time in the interval following the previous surveillance and prior to the current surveillance. This work could be done at the time the group average curve is replotted during the evaluation of the data from a given surveillance.

NOTES FOR TABLE 4 ON THE FOLLOWING PAGE:

1. Normalization factors are from Table 5 in SP-228.

2. Predicted forces are based on extrapolating the existing surveillance data from the first four tendon surveillances to the planned time for the 5th surveillance.

TABLE 4 - PREDICTED DOME AND HOOP TENDON LIFTOFF FORCES
5th TENDON SURVEILLANCE

TENDON GROUP	TENDON NUMBER	(1) GROUP AVE. NORM. FORCE (KIPS)	(2) NORMAL. FACTOR (KIPS)	(3) = (1) - (2) BASE VALUE PREDICTED FORCE (KIPS)	0.95 BASE VALUE	0.90 BASE VALUE
DOME	D111	1120	26	1094	1039	984
"	D112	1120	-36	1156	1098	1040
"	D113	1120	65	1055	1002	949
"	D225	1120	15	1105	1049	994
"	D226	1120	0	1120	1064	1008
"	D227	1120	-10	1130	1073	1017
"	D324	1120	-15	1135	1078	1021
"	D325	1120	36	1084	1029	975
"	D326	1120	-27	1147	1089	1032
HOOP	12AC	1076	25	1051	998	945
"	13AC	1076	-44	1120	1064	1008
"	14AC	1076	26	1050	997	945
"	29CB	1076	-3	1079	1025	971
"	30CB	1076	28	1048	995	943
"	31CB	1076	-43	1119	1063	1007
"	42BA	1076	59	1017	966	915
"	43BA	1076	-25	1101	993	990
"	44BA	1076	3	1073	1019	965

Figure 2-1 Dome Tendons Force-Time Curve
(Average Of Normalized Surveillance Forces)

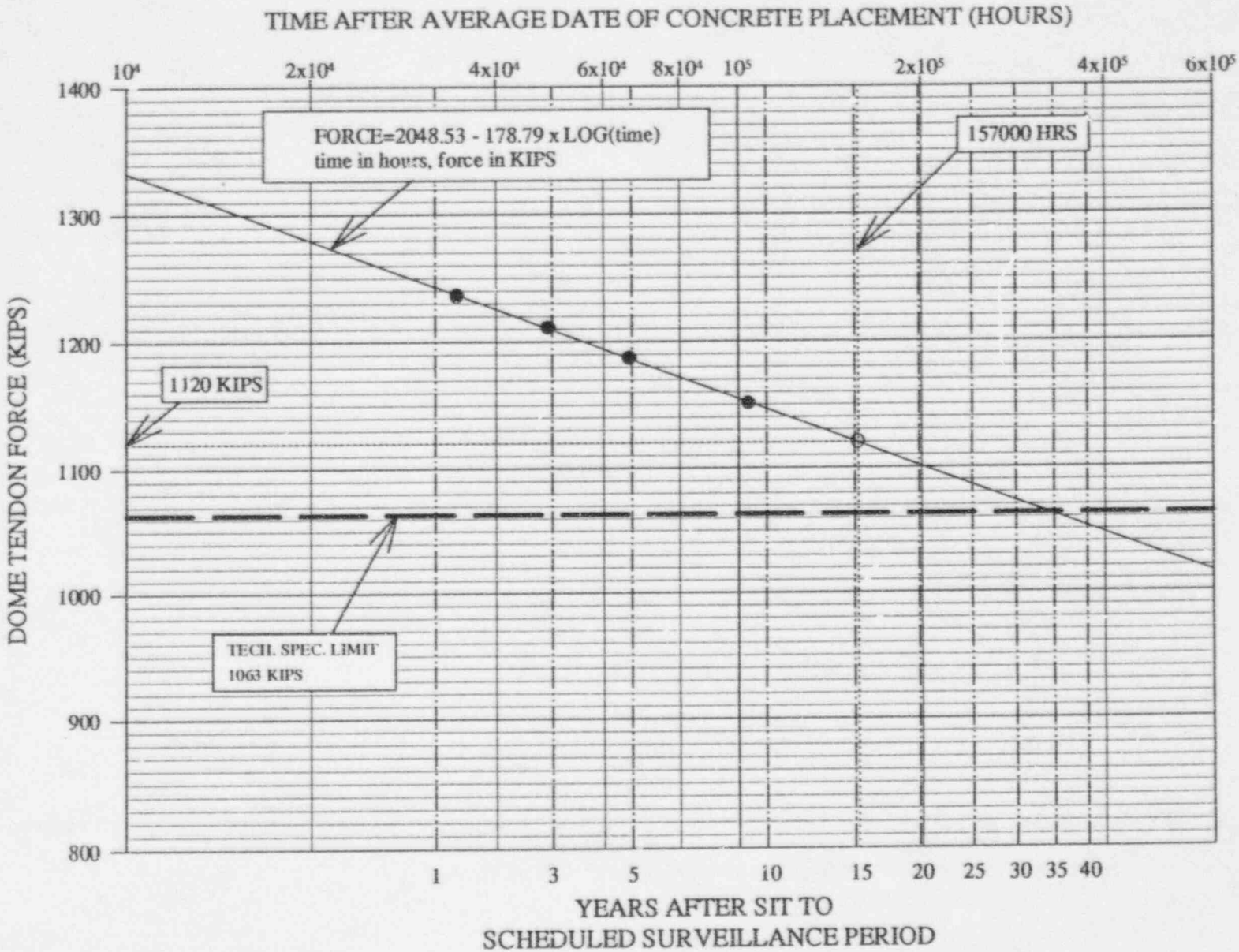

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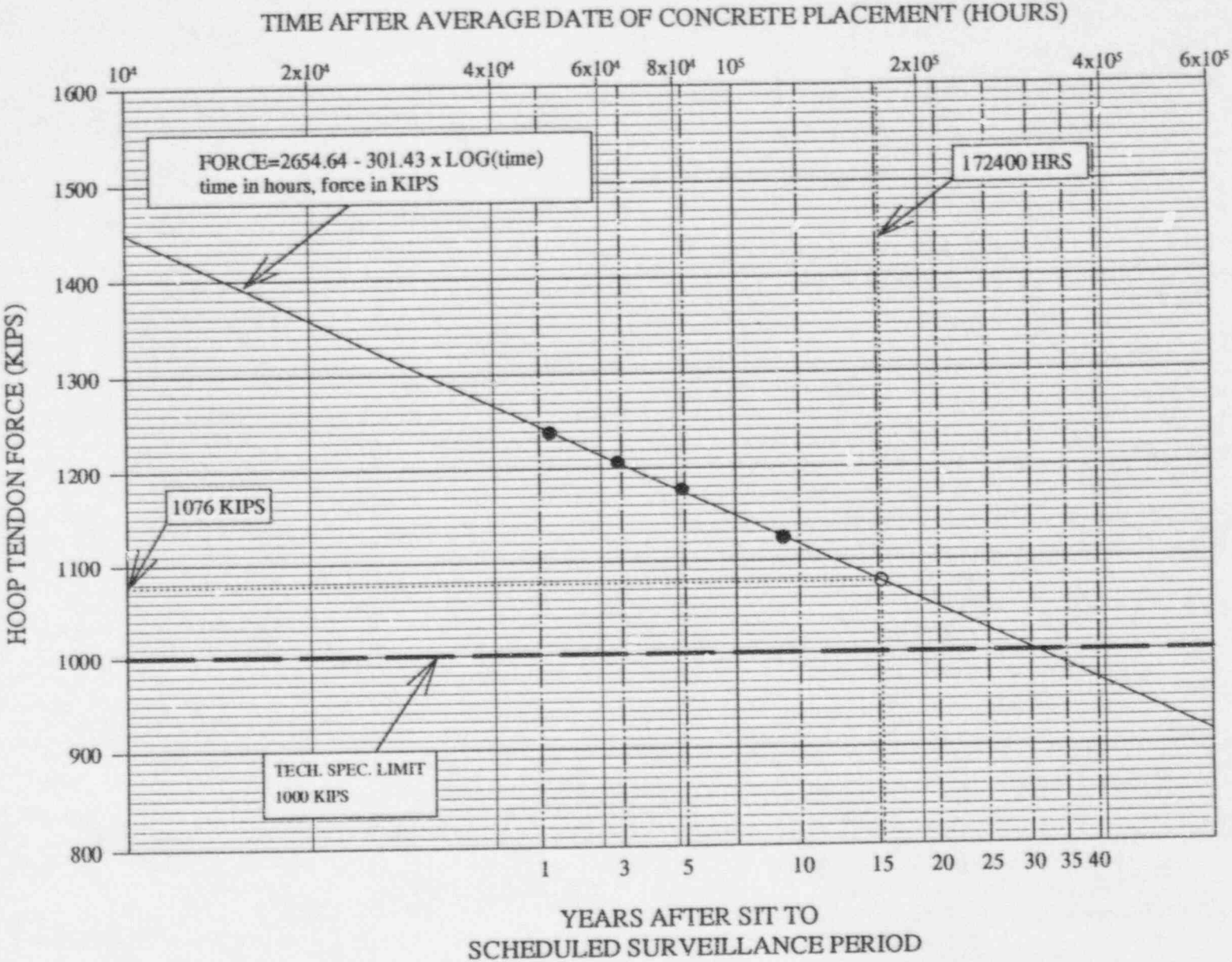
Figure 2-2 Hoop Tendons Force-Time Curve
(Average Of Normalized Surveillance Forces)



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Gilbert Associates, Inc.
Reading, Pennsylvania
ANALYSIS/CALCULATION

SUBJECT	CISID	PAGE
VC Summer - Tendon Surveillance	04-4461-043	1:18.3-156 OF

REV.	0	1	2	3	PAGES
MICROFILMED					
ORIGINATOR	K.A. Murray				
DATE	4/1/81				

B Establish dates
SIT on Jan 1, 1981

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Concrete Placement	First	Last	Avg
Wall	10/23/75 (296)	5/12/77 (132)	7/2/76 (183)
dome	4/12/78 (102)	6/1/78 (152)	5/7/78 (127)

Tendon P/S	First	Last	Avg
Vertical	3/20/79 (79)	4/16/79 (106)	4/2/79 (92)
Hoop	6/21/79 (172)	8/9/79 (221)	7/10/79 (197)
Dome	4/28/79 (118)	5/21/79 (141)	5/10/79 (130)

Ref G.T. DeMass Calcs 3/18/80 page 1 "Tendon Loss Calculations - Time Span"

ERROR 8/3/76 (215)

Time From Cure* to P/S

	Start		Finish	
	Days	Hours	Days	Hours
Vertical	960	23040	987	23688
Hoop	1053	25272	1102	26448
Dome	356	8544	380	9120

* Average Placement Date

Time From Cure* to Surveillances at

	SIT 81		1yr 82		3yr 84		5yr 86		10yr 91		15yr 96	
	Days	Hours	Days +365	Hrs	Days +730	Hrs	Days 731	Hrs	Days 1827	Hrs	Days 1826.5	Hrs
Vertical	1612	38688	1977	47448	2707	64968	3438	82512	5265	126360	7091	170184
Hoop	"	"	"	"	"	"	"	"	"	"	"	"
Dome	969	23256	1334	32016	2064	49536	2795	67080	4622	110928	6448	154752

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MICROFILMED
ORIGINATOR KHMurray
DATE 9/1/81

Time From Cure* to Surveillances at

	20yr 37		25 26		30 11		35 16		40 21	
	Days	Hrs	Days	Hrs	Days	Hrs	Days	Hrs	Days	Hrs
	1827		1826		1826		1826		1827	
Vertical	8918	214032	10744	257856	12570	301680	14396	345504	16223	389352
Hoop	"	"	"	"	"	"	"	"	"	"
Dome	8275	198600	10101	242424	11927	286248	13753	330072	15580	373920

~~Attached is original constructor record.~~ KHM 12/11/81

Add 2,232

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TABLE 5-1. MEASURED VS. PREDICTED FORCES
FOURTH SURVEILLANCE - VERTICAL TENDONS

Tendon No.	(1) Average Liftoff Force (Kips)	(2) Group Average Force (Kips)	(3) Normalizing Factor (Kips)	(4) Predicted Liftoff Force (Kips)	(5) % of Base Predicted Force |(1) ÷ (4)| 100 Method 1	(6) Predicted Liftoff Force (Kips) (2) - (3)	(7) % of Base Predicted Force |(1) ÷ (6)| 100 Method 2	(7) - (5)
V1	1170	1190	+1	1251	93.5	1189	98.4	4.9
V2	1161	1190	+23	1228	94.5	1167	99.5	5
V3	1187	1190	-10	1262	94.1	1200	98.9	4.8
V4	1188	1190	+12	1242	95.7	1178	100.8	5.1
V5	1193	1190	-13	1264	92.4	1203	99.2	6.8
V7	1197	1190	-14	1264	94.7	1204	99.4	4.7
V51	1199	1190	-9	1258	95.3	1199	100.0	4.7
V63	1216	1190	-9	1259	96.6	1199	101.4	4.8
V90	1187	1190	+12	1239	95.8	1178	100.8	5
V94	1218	1190	-12	1264	96.4	1202	101.3	4.9

AVE = 5.1%

Notes:
1. Fourth period surveillance tendons experiencing jack stressing adaptor rotation during liftoff as well as previously retensioned tendons are excluded from this comparison.
2. Method 1 - Method used for predicted forces for fourth surveillance.
   Method 2 - Proposed method to predict liftoff forces for future surveillances.

TABLE 5-2. MEASURED VS. PREDICTED FORCES
FOURTH SURVEILLANCE - DOME TENDONS

Tendon No.	(1) Average Liftoff Force (Kips)	(2) Group Average Force (Kips)	(3) Normalizing Factor (Kips)	(4) Predicted Liftoff Force (Kips)	(5) % of Base Predicted Force [(1) ÷ (4)] 100 Method 1	(6) Predicted Liftoff Force (Kips) (2) - (3)	(7) % of Base Predicted Force [(1) ÷ (6)] 100 Method 2	(7)-(5)
D116	1157	1151	-62	1245	92.9	1213	95.4	2.5
D119	1151	1151	+15	1168	98.5	1136	101.3	2.8
D211	1145	1151	+32	1151	99.5	1119	102.3	2.8
D226	1145	1151	0	1182	96.9	1151	99.5	2.6
D303	1147	1151	+8	1178	97.4	1143	99.7	2.3
D332	1185	1151	-16	1200	98.8	1167	101.5	2.7

AVE = 2.6 %

Notes:
1. Fourth period surveillance tendons experiencing jack stress adaptor rotation during liftoff as well as previously retensioned tendons are excluded from this comparison.
2. Method 1 - Method used for predicted forces for fourth surveillance.
   Method 2 - Proposed method to predict liftoff forces for future surveillances.

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TABLE 5-3. MEASURED VS. PREDICTED FORCES
FOURTH SURVEILLANCE - HOOP TENDONS

Tendon No.	(1) Average Liftoff Force (Kips)	(2) Group Average Force (Kips)	(3) Normalizing Factor (Kips)	(4) Predicted Liftoff Force (Kips)	(5) % of Base Predicted Force |(1) ÷ (4)| 100 Method 1	(6) Predicted Liftoff Force (Kips) (2) - (3)	(7) % of Base Predicted Force |(1) ÷ (6)| 100 Method 2	(7)-(5)
7AC	1172	1123	-33	1218	96.2	1156	101.4	5.2
12AC	1118	1123	+25	1159	96.5	1098	101.8	5.3
13AC	1141	1123	-44	1228	92.9	1167	97.8	4.9
15BA	1140	1123	-53	1241	91.9	1176	96.9	5
16BA	1081	1123	+7	1179	91.7	1116	96.9	5.2
32AC	1102	1123	+15	1171	94.1	1108	99.5	5.4
33AC	1121	1123	-10	1195	93.8	1133	98.9	5.1
34AC	1053	1123	+50	1136	92.7	1073	98.1	5.4
34CB	1099	1123	+58	1128	97.4	1065	103.2	5.8
43AC	1167	1123	-34	1221	95.6	1157	100.9	5.3
46AC	1141	1123	+41	1145	99.7	1082	105.5	5.8
								5.3 %

Notes:
1. Fourth period surveillance tendons experiencing jack stressing adaptor rotation during liftoff as well as previously retensioned tendons are excluded from this comparison.
2. Method 1 - Method used for predicted forces for fourth surveillance.
   Method 2 - Proposed method to predict liftoff forces for future surveillances.

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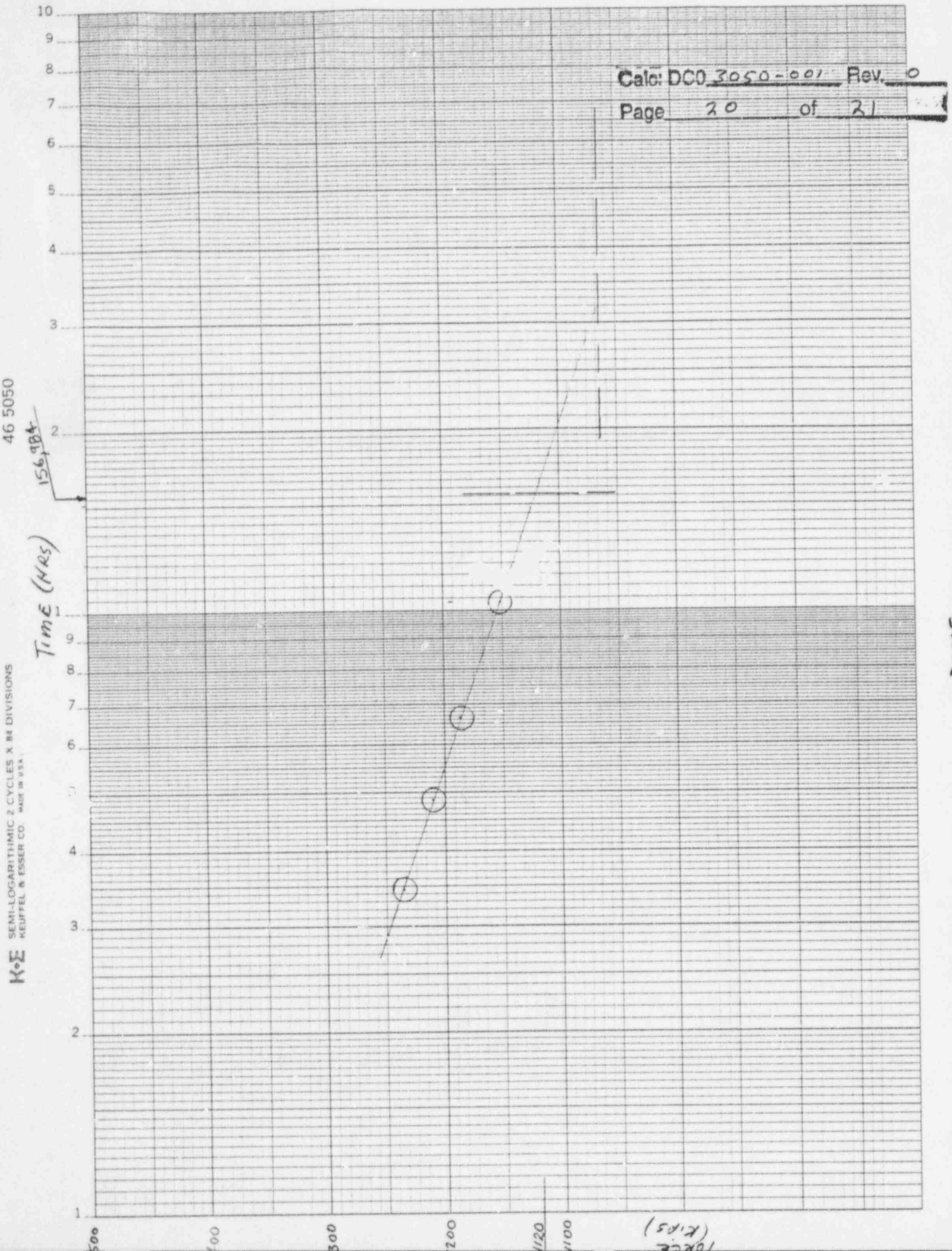
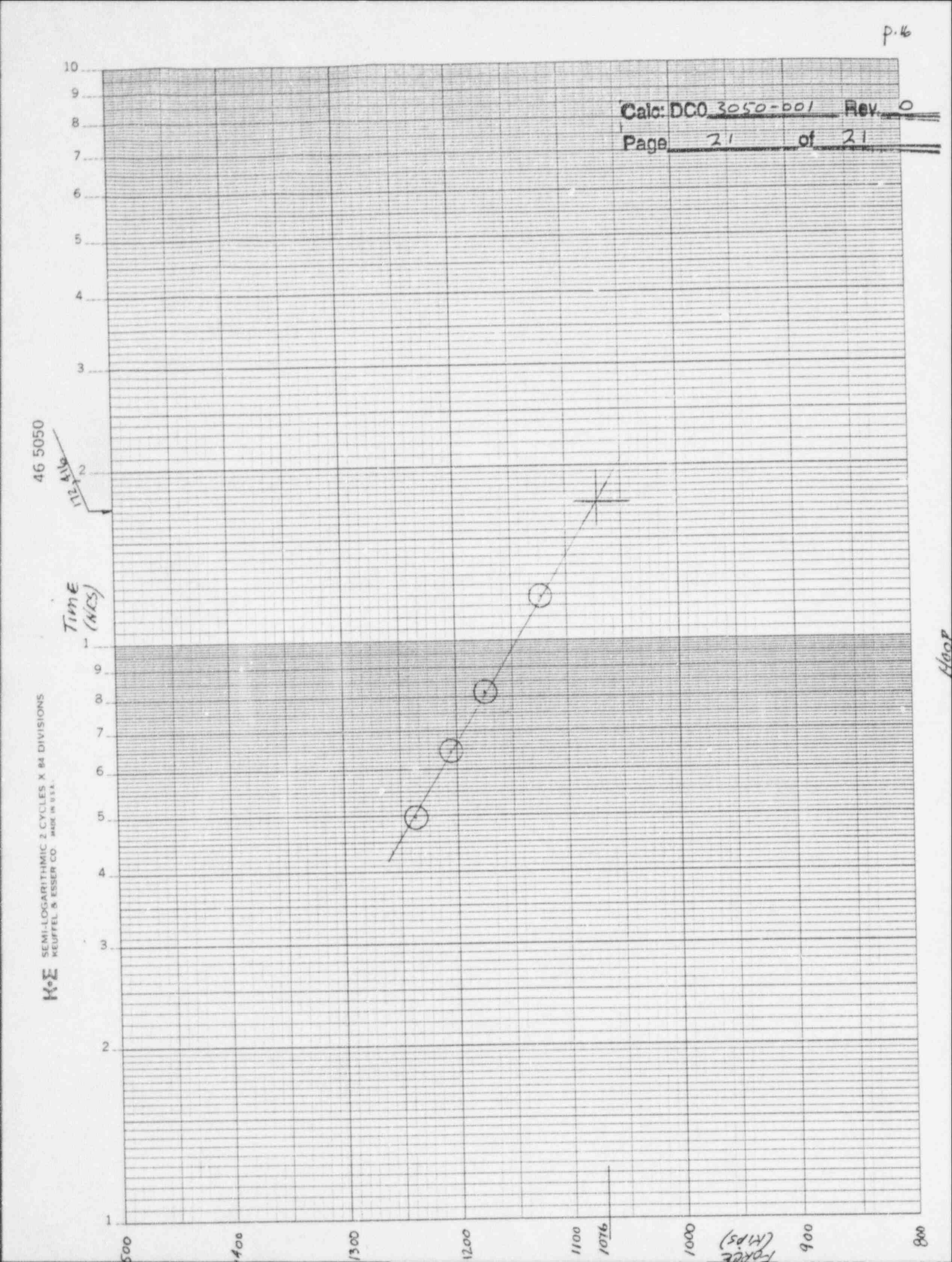
p.14


10
9
8
7
6
5
4
3
2
1
TIME (HRS)
156,984
46 5050
K•E SEMI-LOGARITHMIC 2 CYCLES X 84 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.


46 5050
K&E SEMI-LOGARITHMIC 2 CYCLES X 84 DIVISIONS
KEUFFEL & ESSER CO MADE IN U.S.A.
TIME (MCS)
FORCE (KIPS)
1076
1100
1000
900
800
1300
1200
1400
1500

SOUTH CAROLINA ELECTRIC & GAS COMPANY REVISION SUMMARY	PAGE 2 OF 4

CALCULATION NO.
DC03050-001

REV NO.	SUMMARY DESCRIPTION
1	The purpose of revision 1 of this calculation is to correct an error in revision 0 of this calculation. The error in the original calculation is contained on page 12 of 21. The corrected page follows this page. This revision corrects the 95% base value for hoop tendon43BA. This was simply a mathematical error

☐ CONTINUES ON PAGE

SUBJECT CODE 305	SOUTH CAROLINA ELECTRIC AND GAS COMPANY CALCULATION RECORD	PAGE 1 of 4

CALC TITLE	CALC NO.	REV	STAT
CORRECTED 95% BASE PREDICTION FOR 43BA	DC03050-001	1	A RBW 1/18/96

PARENT DOCUMENT	SYSTEM	SAFETY CLASS
STP0160.001	BS	NN QR [SR]

ORIGINATOR	DISC	ORGANIZATION	DATE	XREF NO.
PARSONS, G. P.	CS	SCE&G DE	1/18/96	DC03050-001

I. CALCULATION INFORMATION

CONTENT DESCRIPTION:

THIS CALCULATION REVISION CORRECTS THE 95% BASE VALUE PREDICTED TENDON FORCE FOR HOOP TENDON 43BA FOR THE FIRTH PERIOD SURVEILLANCE.

AFFECTED COMPONENTS/ANALYSIS:

HOOP TENDON 43BA

FOR INFORMATION ONLY

CONTAINS PRELIMINARY DATA/ASSUMPTIONS:

☒ NO ☐ YES, PAGES

COMPUTER PROGRAM USED: ☒ NO

☐ YES, VALIDATION NOT REQ'D. [REF. 3.5]
☐ YES, VALIDATED [ES-412]
☐ YES, VALIDATED [OTHERS]
☐ PROGRAM VALIDATION CALCULATION

B. VERIFICATION

VERIFICATION SCOPE

VERIFY THE MATH IS CORRECT.

VERIFIER: WHORTON, R. B.

ASSIGN BY: WHORTON, R. B.

Greg Parsons 1/18/96
LEAD ENGINEER (DESIGNEE)/DATE

VERIFIER / DATE	APPROVAL / DATE
RBWhorton 1/18/96	RBWhorton 1/18/96

C. RECORDS

TO PRS: _____
INIT/DATE

REEL NUMBER:

FRAME NUMBER:

ORIGINAL MAINTAINED BY:

SCE&G DE

DISTRIBUTION: CALC FILE [ORIGINAL]
PDE _____ /SYSTEM ENG _____ /DE FILE 20.6602 [ATTACH. 1 ONLY, COPY]

ENGINEERS
TECHNICAL WORK RECORD

Serial 10606
Engineer G. Parsons
Date 1/18/96

Project Title RB Hoop and Dome Tendon Force Calculations Page 1 of

Calc: DC0 3050-001 Rev. 1
Page 3 of 4

A. PURPOSE:

The purpose of revision 1 of this calculation is to correct an error in revision 0 of this calculation. The error in the original calculation is contained on page12 of 21. The corrected page follows this page.

B. DESIGN INPUTS:

The revision to this calculation is a correction to the previous revision. This revision has no inputs. This revision simply corrects a calculation of the previous revision.

C. COMPUTER CALCULATIONS:

There are no computer calculations in this revision.

D. ASSUMPTIONS:

There are no assumptions in this revision which require future conformation.

E. METHODOLOGY:

The methodology used in making this revision is identical to the methodology used in the base calculation.

F. CALCULATION DOCUMENTATION:

Calculation documentation is contained in the following page.

G. SUMMARY:

This revision corrects the 95% base value for hoop tendon43BA. This was simply a mathematical error. Note: These values are rounded down to the nearest whole number.

ENGINEERS
TECHNICAL WORK RECORD

Serial _____
Engineer D.Krause
Date 10-13-95
Page 7 of_

Project Title Predicted Force - Hoop and Dome Tendons

File ID : A:\TENDON6.DOC

TABLE 4 - PREDICTED DOME AND HOOP TENDON LIFTOFF FORCES
5th TENDON SURVEILLANCE

TENDON GROUP	TENDON NUMBER	(1) GROUP AVE. NORM. FORCE (KIPS)	(2) NORMAL. FACTOR (KIPS)	(3) = (1) - (2) BASE VALUE PREDICTED FORCE (KIPS)	0.95 BASE VALUE	0.90 BASE VALUE
DOME	D111	1120	26	1094	1039	984
"	D112	1120	-36	1156	1098	1040
"	D113	1120	65	1055	1002	949
"	D225	1120	15	1105	1049	994
"	D226	1120	0	1120	1064	1008
"	D227	1120	-10	1130	1073	1017
"	D324	1120	-15	1135	1078	1021
"	D325	1120	36	1084	1029	975
"	D326	1120	-27	1147	1089	1032
HOOP	12AC	1076	25	1051	998	945
"	13AC	1076	-44	1120	1064	1008
"	14AC	1076	26	1050	997	945
"	29CB	1076	-3	1079	1025	971
"	30CB	1076	28	1048	995	943
"	31CB	1076	-43	1119	1063	1007
"	42BA	1076	59	1017	966	915
"	43BA	1076	-25	1101	~~993~~ 1045	990
"	44BA	1076	3	1073	1019	965

Calc: DCO 3050-001 Rev. 1
Page 4 of 4

Calc: DCO 3050-001 Rev. -0
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