Document Header Sheet

VSNEWFOLD

RAN	90035- 07786
DOC	WR341602
3F3N #	

0/95

WORKING COPY

PRINTED 10/27/97 07:48

[redacted]

Florida Power CORPORATION

WORKING COPY

NU 0341602

CR-3 WORK REQUEST FORM 07786

PART 1

TAG NO : 5011 SYS: MX DEF. TAG NO:

TAG DESC : PRESTRESSING SYSTEM TENDONS

BUILDING : REACTOR BUILDING ELEV: CAL SP: N/A

LOCATION : CONTAINMENT

PURPOSE : TENDON GALLERY
SIXTH TENDON SURVEILLANCE PER SP-182 TO BE PERFORMED BY PRE

INITIATOR: LESE, JOSEPH A PHONE: 240-1509 DATE: 03/11/97 TIME: 13:47

PART 2

SAFETY RELATED:	YES	PMT :	NO	QC :	YES	REPEAT MAINT:	NO	AMS#:	652000190030		
EQ EQUIPMENT :	NO	PRIORITY :	3	ISI :	YES	HISTORY REQD:	NO	RWP :	YES		
		TAG ORDER:	NO	NDE :	NO	NPRDS :	NO	SPV :	NO		
SHOP :	F	BREACH :	NO	WT :	NO	SNES :	NO	ANII:	YES		
PARTS :	YES	FPWP :	NO	IP :	YES	NOCS :	NO				

REQUIRED WORK PROCEDURES: SP-182✓

REFERENCE WORK PROCEDURES: AI-1803 AI-1811 SP-601 CP-113A

POST MAINTENANCE TEST PROCEDURES: NONE

EVALUATED BY:	GRAHAM, STANLEY A	PHONE: 240-3349	DATE: 07/07/97	TIME: 11:08
ISI APPROVAL:	LAWSON, BOBBY R	PHONE: 240-3752	DATE: 07/09/97	TIME: 08:11
IPDE APPROVAL:	GRAHAM, STANLEY A	PHONE: 240-3349	DATE: 07/07/97	TIME: 11:08

ANII
CSC 1-12-99

ESTIMATED MANHOURS: 500.0 $16,608

PART 3

WORK SUPERVISOR: [signature] DATE: 10/15/97

WORK AUTHORIZATION SHIFT SUPERVISOR/DATE | SAFETY BRIEFING CONDUCTED BY/DATE

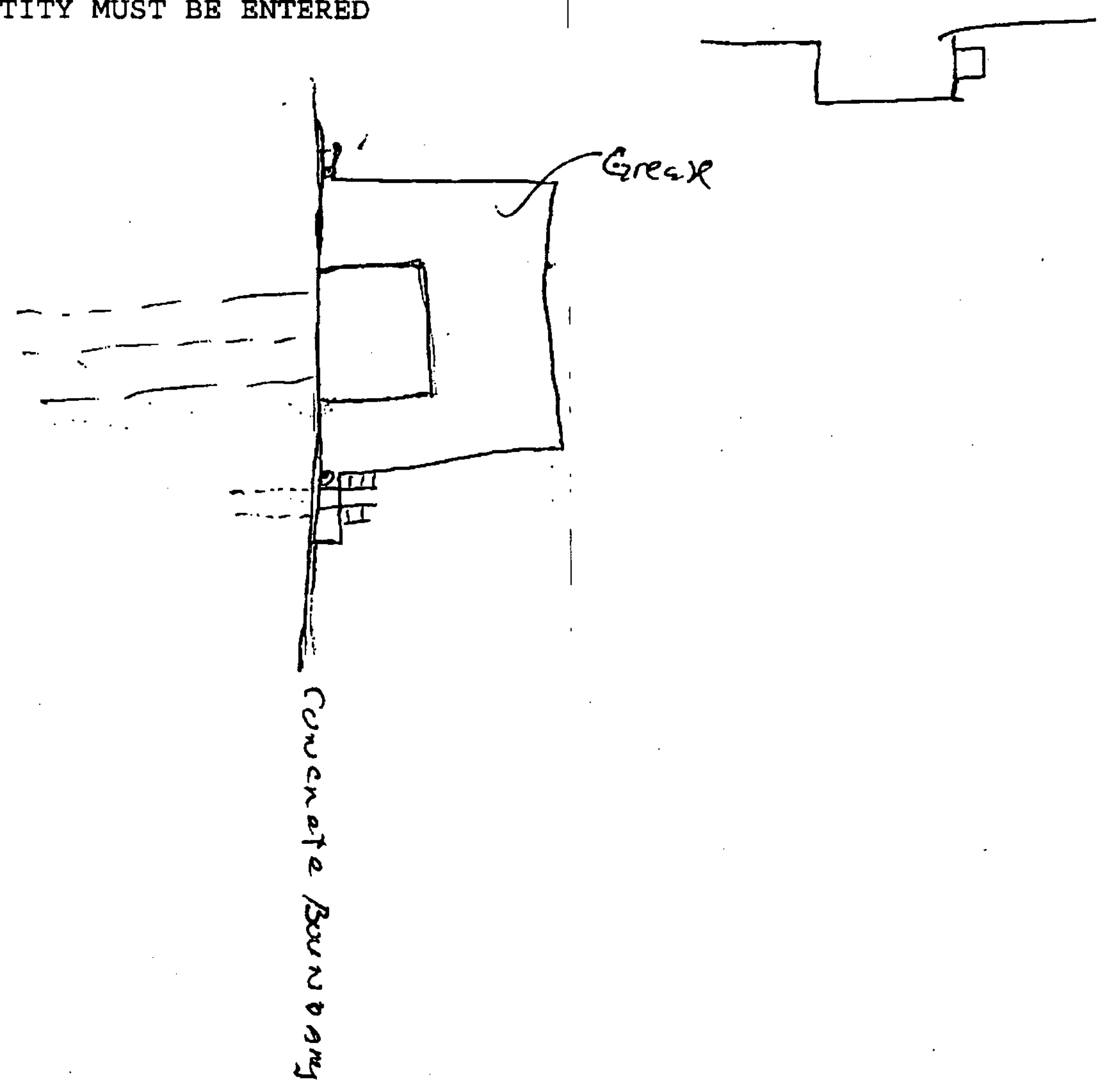
Authorization received during pre-job brief - signature inadvertently not obtained - [signature] 10/15/97 | MATT LENNY 10/16/97

MC775F10 MAINTENANCE ACTIVITY CONTROL SYSTEM DATE: 06/05/98
MC775M10 BOM INSTALL PART UPDATE TIME: 10:39:06

DOC:NU 0341602 TAG: 5011 TAG STATUS: O

FIMIS NUMBER	PART DESCRIPTION	BOM QTY	ISSUE QTY	UI	TE XT	DATE INSTALL (MMDDYY)	INSTALL QTY
1402420	ADHSV POLYGUARD 600	0	1	GL	N	110797	1
1700344	BEVRG LEMON LIME GATORADE	0	12	CS	N		
1700343	BEVRG ORG GATORADE	0	10	CS	N		
1460005	BLD BNDSW 1"X.035" PENE	0	1	EA	N		
1460004	BLD BNDSW 1"X.042" PENE	0	1	EA	N		
1460006	BLD SIL C-916S BANDSAW	0	1	EA	N		
~~1014604~~	~~BLT HH CS 1X4" A449~~	0	45	EA	N	QCI MISSING	
1014552	BLT HH CS 3/4X3-1/2"A449	0	8	EA	N		
62431541	BLT STUD 3/4-10X4-1/2"	0	19	EA	N		
472201	BTRY ALKALINE AAA 1.5V	0	96	EA	N		
472202	BTRY 1.5V ALKALIN AA	0	16	EA	N		
431104	BTRY 1-1/2V ALKALIN D FLS	0	12	EA	N		

RESP: F6=ADD PART ENTER=UPDATE F7=PAGE UP F2=PRIOR TAG
F4=PRINT: F10=RETURN > F8=PAGE DOWN F3=NEXT TAG
* INSTALL QUANTITY MUST BE ENTERED



DDE GUNTHAM / DENNY

MATT, WHAT is This??

P.O. DATE
12/19/97
PAGE
1

Florida Power CORPORATION

NUCLEAR OPERATIONS PURCHASING, SA2E, 15760 W. POWERLINE ST.
CRYSTAL RIVER, Florida 34428-6708
Telephone (352) 563-2943

PURCHASE ORDER

ENTITY	PURCHASE ORDER
NUC	F886739A

BLANKET RELEASE

CHANGE NOTICE

TO:
SCOTTY'S INC

430 N. SUNCOAST BLVD.
CRYSTAL RIVER FL 34429

SHIP TO: FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3 STOREROOM

15760 WEST POWERLINE STREET

CRYSTAL RIVER, FL 34428
ATTENTION: F886739A

BUYER	SHIP VIA	F.O.B.	FREIGHT TERMS	VENDOR	TERMS OF SALE
088	FPC PICKUP	DESTINATION	DFPA	778084	NET 30

LINE ITEM	ORDER QUANTITY	UNIT	FPC PART NUMBER	DESCRIPTION	DATE REQUIRED	UNIT PRICE
				****************** MINOR PURCHASE ORDER * ANY QUESTIONS REGARDING THIS ORDER SHOULD BE DIRECTED TO PURCHASING AT 352-563-4343. * TOTAL AMOUNT OF THIS ORDER SHALL NOT BE EXCEEDED AND THIS AMOUNT SHALL BE REVISED ONLY BY WRITTEN CHANGE NOTICE. INVOICES IN EXCESS OF THE AUTHORIZED AMOUNT SHALL BE RETURNED TO THE VENDOR. ************** * THIS IS A CONFIRMING ORDER. DO NOT DUPLICATE. NATALIE HA[illegible] ESS TO RICK ON 12/18/97 * >>>>>>>> FPC INTERNAL NOTE TO STOREROOM <<<<<<<< UPON RECEIPT, DELIVER TO THE FOLLOWING: 289 ATTN: KEN MAYER		
01	1	EA	*MINORPUR	PVC PIPE 2" X 10', SKU #693177	12/19/97	4.990

Any provisions to the contrary notwithstanding it is understood that items and conditions submitted by the vendor in conflict with the terms and conditions on the reverse side of this Purchase Order shall be superseded by the applicable provisions of the Uniform Commercial Code (UCC) as adopted in the State of Florida, Chapter 6/2, Florida Statutes. This notice constitutes notice pursuant to Section 6/2.207(2)(c), Florida Statutes.

XXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXX

SUBJECT TO CONDITIONS ON BACK OF THIS ORDER

BY

PLEASE SUBMIT INVOICE TO: 15760 W. POWERLINE ST.
SA2I ACCOUNTS PAYABLE SECTION, CRYSTAL RIVER, FLORIDA 34428-6708

PLANT & DEPRECIATION ACCT.

REV. 12/95

RET: 6 Yrs. RESP: Purchasing 935 510

P.O. DATE
12/19/97
PAGE
2

Florida Power CORPORATION

NUCLEAR OPERATIONS PURCHASING, SA2E, 15760 W. POWERLINE ST.
CRYSTAL RIVER, Florida 34428-6708
Telephone (352) 563-2943

PURCHASE ORDER

ENTITY	PURCHASE ORDER
NUC	F886739A

BLANKET RELEASE

CHANGE NOTICE

TO:
SCOTTY'S INC
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CRYSTAL RIVER FL 34429

SHIP TO: FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3 STOREROOM
15760 WEST POWERLINE STREET
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ATTENTION: F886739A

BUYER	SHIP VIA	F.O.B.	FREIGHT TERMS	VENDOR	TERMS OF SALE
088	FPC PICKUP	DESTINATION	DFPA	778084	NET 30

LINE ITEM	ORDER QUANTITY	UNIT	FPC PART NUMBER	DESCRIPTION	DATE REQUIRED	UNIT PRICE
				********** F.P.C. INTERNAL DATA ************		
				0615 220NU0341602		
02	2	EA	*MINORPUR	END CAPS FOR PVC PIPE, SKU #695281	12/19/97	0.860
				********** F.P.C. INTERNAL DATA ************		
				0615 220NU0341602		
				PO TOTAL==> 6.71		

Any provisions to the contrary notwithstanding it is understood that items and conditions submitted by the vendor in conflict with the terms and conditions on the reverse side of this Purchase Order shall be superseded by the applicable provisions of the Uniform Commercial Code (UCC) as adopted in the State of Florida, Chapter 6/2, Florida Statutes. This notice constitutes notice pursuant to Section 6/2.207(2)(c), Florida Statutes.

PLEASE SUBMIT INVOICE TO: 15760 W. POWERLINE ST.
SA2I ACCOUNTS PAYABLE SECTION, CRYSTAL RIVER, FLORIDA 34428-6708

REV. 12/95

XXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXX

SUBJECT TO CONDITIONS ON BACK OF THIS ORDER

BY Clair Lamb 12-30-97

PLANT & DEPRECIATION ACCT.

RET: 6 Yrs. RESP: Purchasing 935 510

LIMITS & PRECAUTIONS:

THIS WORK WILL GENERATE RADWASTE VOLUME. WORK SUPERVISOR AND/OR LEAD PERSON MUST DISCUSS, AND UTILIZE, WASTE VOLUME REDUCTION TECHNIQUES WITH ASSIGNED WORKERS.

INITIATORS OBSERVATIONS:

THE SIXTH TENDON SURVEILLANCE PER SP-182 IS TO BE PERFORMED BY PRECISION SURVEILLANCE CORP. UNDER CONTRACT N01309AD.
USE SP-182
SIXTEEN (16) TENDONS ARE TO BE INSPECTED. THE CTED. THE PROJECT MANAGER FOR THIS WORK IS JOE A. LESE. CONTRACTOR IS EXPECTED ON SITE DURING SEPT 1997. DURATION OF WORK IS EXPECTED TO BE EIGHT (8) TO TEN (10) WEEKS. THE FOLLOWING SUPPORT WILL BE REQUIRED:

A. HEALTH PHYSICS
B. SECURITY
C. MECHANICAL SUPPORT (SCAFFOLDING, RIGGING, LIFTING)
D. TEMPORARY POWER ON RB DOME
E. PAINTING OF REMOVED TENDON CAPS

ADDITIONAL WORK REQUESTS WILL BE GENERATED FOR THE SPECIFIC FUNCTIONS AS MENTIONED ABOVE. REFERENCE PREVIOUS WORK REQUESTS 301315 AND 306933 GENERATED IN SUPPORT OF THE 5TH TENDON SURVEILLANCE PERFORMED DURING THE FALL/WINTER OF 1993.

INSPECTION REQUIREMENTS/COMMENTS:

RELATED DOCUMENT: SP-182

NQC TO PERFORM ANY REQUIRED SP-182 INSPECTIONS.

THIS DOCUMENT HAS BEEN REVIEWED BY AN INSPECTION PLANNER PER CP-113C FOR THE IDENTIFICATION OF INSPECTIONS WHICH ARE NECESSARY TO ASSURE COMPLIANCE WITH THE ENGINEERING DESIGN AND WITH THE MATERIAL FABRICATION, ASSEMBLY, ERECTION, INSTALLATION, AND EXAMINATION AND TEST REQUIREMENTS.

WORK DESCRIPTION:

PREREQUISISTES OF SP-182 MUST BE MET.
SP-182 SIXTH SURVEILLANCE PERIOD INSPECTIONS ARE TO BE PER FORMED BY CONTRACTOR.

.

NOTIFY SECURITY FOR ANY NEEDED SUPPORT.

.

NOTIFY NQC PRIOR TO START OF WORK.

.

NOTIFY HEALTH PHYSICS OF REQD SUPPORT.

.

PERFORM INSPECTION PERIOD # 6 REACTOR BUILDING STRUCTURAL INTEGRITY TENDON SURVEILLANCE IAW SP-182 UNDER CONTRACT NUMBER N01309AD.

.

PROJECT MANAGER FOR THIS WORK IS NED JOE LESE.
ADDITIONAL WORK SCOPE, IF ANY, WILL BE IDENTIFIED BY HIM AT JOB ONSET, OR PROGRESSION.

.

DURATION OF WORK IS EXPECTED TO BE (8) TO (10) WEEKS.

.

ADDITIONAL WORK REQUESTS WILL BE GENERATED FOR THE SPECIFIC FUNCTIONS AS PAINTING OF TENDON CAPS, SCAFFOLDING,TEMPORARY ELEC POWER REQMTS, TEMPORARY FABRICATION ITEMS , ETC. REFERENCE PREVIOUS WORK REQUESTS 301315 AND 306933 GENERATED IN SUPPORT OF OF SP-182

.

NOTE: FPC PROJECT MANAGER (JOE LESE OR ALTERNATE) HAS THE RESPONSIBILITY OF COMPLETING PACKAGE CLOSE OUT.

DOCUMENT WORK PERFORMED, AS FOUND DATA, AND AS LEFT STATUS.

FLORIDA POWER CORPORATION
MAINTENANCE ACTIVITY CONTROL SYSTEM
NOTES FOR WDOC NU0341602, TAG 5011

DATE: 10/27/97

NOTEPAD TEXT

.

DWG. L-001-002

.

THIS WR PRINTED AND GIVEN TO MATT DENNY.

BILL OF MATERIALS FOR NU0341602

ENSURE REMOVAL OF AS MUCH PACKAGING FROM EACH ITEM AS POSSIBLE PRIOR TO RCA ENTRY

TAG	FIMIS NBR	DESCRIPTION	BOM QTY	GR LT	BM ST	RR	INSTALL QTY	INSTALL DATE
5011								
	0001700344	BEVRG LEMON LIME GATORADE	0		I		____	____
	0001700343	BEVRG ORG GATORADE	0		I		____	____
	0001014604	BLT HH CS 1X4" A449	0		I		____	____
	0001400294	DRUM 55GL BLACK LID/CLMP	0		I		____	____
	0001430382	OIL VISC 2090P-4 VSL CORP	0	Y	I		____	____

12/08/97 FLORIDA POWER CORPORATION PAGE: 01
12:40:11 NUCLEAR ISSUE DOCUMENT RA EAC ACT TASK
PROJECT - NU0341602 PI370964 0615 220 NU0341602

STRM#: 293 ORG.NAME: MAYER, KENNETH DLV.DATE: 12/ 8/97 TIME: 13:00

COMMENTS: WILL PICKUP AT 293

BIN LOC SLED.QTY	PART NBR SLED	UI N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION PO #	HEAT / LOT #	SPC HND	NET AVAL ON HAND
AD-040-F	1035626	EA	4		CVRALLS CTN 46R L-SLV/ZIP			0
		N		0				0
AV-29M-2	62431541	EA	11		BLT STUD 3/4-10X4-1/2"			0
		S		11	QCR03523	N/A		0
AV-30M-2	1150830	EA	12		WSHR FLT CIR CS 3/4" F436			349
		S		12	F849120K	N/A		1644
BD-042-B	1496407	EA	12		NUT HH CS 3/4-10NC CL 1			281
		S		12	F849110D	HT 8860392		1277

ISSUED BY: Carol Hinman 12-8-97

RECEIVED BY: Kenneth Mayer DATE: 12-8-97

11/07/97 FLORIDA POWER CORPORATION PAGE: 1
15:24:46 NUCLEAR ISSUE DOCUMENT
PROJECT - NU0341602 PI368468

RA EAC ACT TASK
0615 220 NU0341602

STRM#: 293 ORG.NAME: IRLBECK, DUSTIN DLV.DATE: 11/ 7/97 TIME: 15:00

COMMENTS: WILL PICK-UP FROM 293, QUESTIONS X-3909

BIN LOC / SLED.QTY	PART NBR / SLED	UI / N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION / PO # HEAT / LOT #	SPC HND	NET ON HAND / AVAL
AV-29M-2	62431541	EA	8		BLT STUD 3/4-10X4-1/2"		11
		S		8	L810079D NA		11
AV-30M-2	1150830	EA	8		WSHR FLT CIR CS 3/4" F436		367
		S		8	F849120K NA		1662
BD-042-B	1496407	EA	8		NUT HH CS 3/4-10NC CL 1-3		299
		S		8	F849110D H#8860392		1318

ISSUED BY: [signature]

RECEIVED BY: [signature] DATE:

12/17/97 FLORIDA P[illegible] [illegible]PORATION PAGE: 01
13:31:08 NUCLEAR [illegible] [illegible]CUMENT RA EAC/ACT TASK
PROJECT - NU0344602 0615 220 NU0344602

STRM#: 293 ORG.NAME: MAYER, KENNETH [illegible]TE: 12/17/97 TIME: 16:00

COMMENTS: DELIVER TO 209 FOR PICKUP

BIN LOC / SLED.QTY	PART NBR / SLED	UI / N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION / PO-# HEAT / LOT #	SPC HND	NET AVAL ON HAND
AC-016-B	1700343	CS / N	2	2	BEVRG ORG GATORADE		23 / 23
AC-020-B	1700344	CS / N	2	2	BEVRG LEMON LIME GATORADE		45 / 45
TR-AIL-E	1400294	EA / N	2	2	DRUM 55GL BLACK LID/CLMP		34 / 42
* WARNING *					USE RESTRICTED. DO NOT USE AS OUTER CONTAINER FOR RADWASTE SHIPMENTS		

ISSUED BY: C Russo

RECEIVED BY: K. Mayer/[illegible]

DATE: 12/17/97

10/20/97 FLORIDA POW[illegible] ORATION PAGE: 01
23:55:15 NUCLEAR I[illegible] [illegible]UMENT RA EAC ACT TASK
PROJECT - NU0341602 0615 220 NU0341602

STRM#: 293 ORG.NAME: MAYER, KENNETH DLV.DATE: 10/22/97 TIME: 09:00

COMMENTS: SEE PI366384 FOR INSTRUCTIONS

BIN LOC SLED.QTY	PART NBR SLED	UI N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION PO # HEAT / LOT #	S C HND	NET AVAL ON HAND
TR-AIL-E	1400294	EA	6		DRUM 55GL BLACK LID/C[illegible]		19
		N		6			[illegible]3
	* WARNING *				USE RESTRICTED. DO NOT USE AS OUTER CONTAINER FOR RADW ASTE SHIPMENTS		

[illegible] V-3478

out side DOOR

ISSUED BY: [signature] P. CLARK

RECEIVED BY: [illegible]

DATE: [illegible]

12/01/97 FLORIDA POWER CORPORATION PAGE: 01
17:30:03 NUCLEAR ISSUE DOCUMENT
PROJECT - NU0341602 PI370331

RA	EAC	ACT	TASK
0615	220		NU0341602

STRM#: 293 ORG.NAME: MAYER, KENNETH DLV.DATE: 12/ 1/97 TIME: 18:00

COMMENTS: PLEASE DELIVER TO 289 READY WHSE

BIN LOC SLED.QTY	PART NBR SLED	UI N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION PO # HEAT / LOT #	SFC HND	NET AVAL ON HAND
CC-018-D	1402420	GL	1		ADHSV POLYGUARD 600		3
	05/13/98	N		1			3

JIM BAIZE
289 CHEM
CONTROL

RECEIVED BY: DATE:

10/28/97 FLORIDA POWER CORPORATION PAGE: 01
12:21:32 NUCLEAR ISSUE DOCUMENT RA EAC ACT TASK
PROJECT - NU0341602 PI367327 0615 220 NU0341602

STRM#: 293 ORG.NAME: IRLBECK, DUSTIN DLV.DATE: 10/28/97 TIME: 12:30

COMMENTS: WILL PICK-UP AT 293 BY DUSTIN IRLBECK

BIN LOC / SLED.QTY	PART NBR / SLED	UI / N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION / PO #	HEAT / LOT #	SPC HND	NET ON	AVAL HAND
AE-005-B	1014552	EA	8		BLT HH CS 3/4X3-1/2"A449				209
		N		8					209

ISSUED BY: 10/28/97

RECEIVED BY: DATE: 10/28/97

IRLBECK

11/04/97 FLORIDA POWE ...RATION PAGE: 01
08:04:35 NUCLEAR ISS... ...CUMENT
PROJECT - NU0341602 PI3...

RA	EAC	ACT	TASK
0615	220		NU0341602

STRM#: 293 ORG.NAME: IRLBECK, DUSTIN DU... ...TE: 11/ 4/97 TIME: 12:00

COMMENTS: WILL PICK-UP FROM 289 WHEN AVAILABLE

BIN LOC / SLED.QTY	PART NBR / SLED	UI / N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION / PO # HEAT / LOT #	SPC HND	NET AVAL ON HAND
AC-016-B	1700343	CS	3		BEVRG ORG GATORADE		0
		N		0			0
AC-020-B	1700344	CS	3		BEVRG LEMON LIME GATORADE		62
		N		3			62

ISSUED BY: [signature]

RECEIVED BY: [signature] DATE: 11-4-97

11/24/97 FLORI... ER CORPORATION 01
13:44:38 NUCLEAR ISSUE DOCUMENT RA LA... SK
PROJECT - NUC9711 PI369919 0669 220

STRM#: 293 ORG.NAME: BAIZE, JIMMIE R DLV.DATE: 11/24/97 TIME: 14:48

COMMENTS: RESTOCK 289

BIN LOC SLED.QTY	PART NBR SLED	UI N/S	RQD.QTY	ISSUED/ POSTED	PART DESCRIPTION PO #	HEAT / LOT #	SPC HND	NET ON	AVAL HAND
BK-012-A	1036900	CR	40		PAPER 8-1/2X11 20# 3HL WH				123
		N		40					123

ISSUED BY: RECEIVED BY: DATE:

IM041F14 FLORIDA POWER CORPORATION DATE: 12/01/97
IM041M14 FIMIS / MATERIALS SUBSYSTEM TIME: 13:11:17
DOC #: PI370331 CREATE NUCLEAR ISSUES PRINTER: 3WP3

STRM# WR#/MAR# RA # EAC ACTIVITY/TASK REQUESTER SSN DELIVERY INFORMATION
293 00341602 0615 220 NU0341 602 507-92-6698 DATE: 12/01/97
TAG: NONE TIME: 18:00 SHOP:
COMMENTS: PLEASE DELIVER TO 289 READY WHSE PERSON:

PART #	RQD.QTY	UI	NET.AVL	ITEM	OPC	SHORT PART DESCRIPTION
1402420	1	GL	4	A	07	ADHSV POLYGUARD 600

RESPONSE: F2-CONFIRM(OPTIONAL) F3-NEW DOCUMENT
F1-HELP F7-PAGE BACK F8-NEXT PAGE F13-DELETE F10-MENU
NO ERRORS DETECTED - UPDATES HAVE BEEN PROCESSED

```
IM041F14                  FLORIDA POWER CORPORATION              DATE: 10/20/97
IM041M14                 FIMIS / MATERIALS SUBSYSTEM             TIME: 11:18:32
DOC #: PI366391             CREATE NUCLEAR ISSUES             PRINTER: 3WP3

STRM#  WR#/MAR#   RA #  EAC  ACTIVITY/TASK  REQUESTER SSN  DELIVERY INFORMATION
  93   00341602   0615  220  NU0341 602      507-92-6698   DATE: 10/22/97
TAG: NONE                                                  TIME: 09:00   SHOP:
COMMENTS: SEE PI366384 FOR INSTRUCTIONS                  PERSON: K. MAYER

PART #        RQD.QTY   UI    NET.AVL   ITEM   OPC    SHORT PART DESCRIPTION
----------    -------   --   --------    -     --    -------------------------
 1400294            6   EA         25    A     07    DRUM 55GL BLACK LID/CLMP


RESPONSE:                F2-CONFIRM(OPTIONAL) F3-NEW DOCUMENT
F1-HELP                  F7-PAGE BACK         F8-NEXT PAGE   F13-DELETE    F10-MENU
NO ERRORS DETECTED - UPDATES HAVE BEEN PROCESSED
```

362010

41F14
.041M14
.OC [redacted]

FLORIDA POWER CORPORATION
FIMIS / MATERIALS SUBSYSTEM
CREATE NUCLEAR ISSUES

DATE: 10/21/97
TIME: 13:00:28
PRINTER: 3WP3

STRM#	WR#/MAR#	RA #	EAC	ACTIVITY/TASK	REQUESTER SSN	DELIVERY INFORMATION
293	00341602	0615	220	NU0341 602	507-92-6698	DATE: 10/21/97

TAG: NONE
TIME: 14:30 SHOP:
COMMENTS: WILL PICK UP @ 293 WHSE
PERSON: K. MAYER

PART #	RQD.QTY	UI	NET.AVL	ITEM	OPC	SHORT PART DESCRIPTION
1400294	3	EA	19	A	07	DRUM 55GL BLACK LID/CLMP

RESPONSE: F2-CONFIRM(OPTIONAL) F3-NEW DOCUMENT
F1-HELP F7-PAGE BACK F8-NEXT PAGE F13-DELETE F10-MENU
NO ERRORS DETECTED - UPDATES HAVE BEEN PROCESSED

Cooler

FIMIS # 434805

X 3909

CR-3 WORK REQUEST FORM

PART 3

TAG ORDER NO: ________

RWP NO: ________

FPWP NO: ________

RELATED DOCUMENTS (Such as REA, MAR, PR, PEERE): ________

AS FOUND: ☐ EX ☒ GD ☐ PR TEXT: (Be Specific and Include Apparent Root Cause):

Prior to performing the surveillance activities, there were no abnormal conditions noted.

WORK SUMMARY: (Add supporting details to continuation sheet)

performed tendon surveillance on selected tendons per SP-182. The results are presented in the PSC report and the evaluation of the results is presented in the engineering evaluation of inspection data.

LESSONS LEARNED: (May Be Used for Input for Future Planning)

AS LEFT: (Address Status Such as Operable, Incomplete (WR ___), Condition of Area, etc.)

Clean and Operable.

OJT PERFORMED YES X NO ___ IF YES, RECIPIENT ________

PRINT AND SIGN THE FOLLOWING

FIELD WORK VERIFIED/APPROVED BY: [signature] / MATT DENNY DATE: 5/21/98

MAINTENANCE DEFICIENCY TAG REMOVED: INITIAL N/A VERIFIED BY: N/A

PACKAGE CLOSURE APPROVED BY: [signature] / MATT DENNY DATE: 5/21/98

CR-3 WORK REQUEST FORM Continuation

WORKING COPY NU 0341602

DATE ______ All work performed by PSC contracted personnel. COMPONENT ______
SYSTEM ______ PROCEDURES ______
TOTAL MANHOURS ______

PERSONNEL PERFORMING WORK

NAME ______ NAME ______
DATE ______ HRS. ______ DATE ______ HRS. ______
TOTAL ______ TOTAL ______

NAME ______ NAME ______
DATE ______ HRS. ______ DATE ______ HRS. ______
TOTAL ______ TOTAL ______

NAME ______ NAME ______
DATE ______ HRS. ______ DATE ______ HRS. ______
TOTAL ______ TOTAL ______

NAME ______ NAME ______
DATE ______ HRS. ______ DATE ______ HRS. ______
TOTAL ______ TOTAL ______

NOTE: Equipment alterations and equipment alteration durations must be minimized.

The following instructions must be followed when performing equipment alterations:

1. When equipment alterations are performed and/or when they are "returned to normal" the activities must be concurrently/ independently verified. If the specific type of VERIFICATION methodis not specified in the Work Request/Procedure(s), INDEPENDENT and/or CONCURRENT VERIFICATIONS may be performed. The work supervisor must determine the appropriate type of VERIFICATION to be performed where questions arise.

   o CONCURRENT VERIFICATION:

   - Removal or installation of wires, jumpers, or other connections that may cause a plant trip, safety systems actuation, or start of equipment if improperly accomplished or incorrectly identified must be designated as requiring CONCURRENT VERIFICATION prior to any connection/disconnection being made.

   - The verifier will accompany and observe the individual performing the initial position or condition check.

   - Personnel performing the CONCURRENT VERIFICATION should verbally communicate their mutual concurrence with the positioning of equipment as it is being performed.

   o INDEPENDENT VERIFICATION:

   - When INDEPENDENT VERIFICATION of a component is performed and special circumstances require the two individuals performing the task to work together, the act of performing the INDEPENDENT VERIFICATION must be completely separate and independent of the initial alignment, installation or verification.

   - The individual performing the INDEPENDENT VERIFICATION must not rely upon the observed actions of the individual performing the initial alignment, installation or verification to determine the correct component identification, position or condition.

   - INDEPENDENT VERIFICATION is intended to be a "hands-on" operation. Exceptions to this may be granted by the work supervisor on a case-by-case basis.

2. An Equipment Alteration Log must not be used in lieu of a clearance /tagging order when positioning components which are identified by tag in accordance with Configuration Management Information System (CMIS) and are normally positioned by Operations personnel. The Equipment Alteration Log may be used for positioning Instrument Control Valves (V-1 type isolation valves, including those with valid CMIS Tags).

2. IF an equipment alteration must remain in effect beyond the shift during which it was implemented and active maintenance activiities will not continue on the next shift.
THEN the Work Supervisor and the NSSOD must be notified that the equipment alteration will remain in place beyond the present shift.

3. IF an equipment alteration is being performed as part of troubleshootin
THEN the alteration must not be performed on any component or system that is beyond the troubleshooting boundaries.

4. Plant systems or components must not be declared "operable" or returned to service until all equipment alterations are restored to design (as found) status or a Modification Approval Record (MAR) is issued.

5. IF a temporary instrument will be installed to satisfy any Technica Specification Acceptance Criteria,
THEN an Engineering Evaluation must be performed and documented per Request for Engineering Assistance (REA) to ensure the adequacy of the temporary instrument.

6. If possible, equipment alterations should only be performed on plant systems or components that are "completely isolated" (plant system or component that cannot affect any significant actions in interfacing plant systems or components).
WHEN complete isolation is not practical and the effects of the equipment alteration are not completely understood,
THEN the conditions of Step 3.2.6 of MP-531 must be met.

7. Prior to any equipment alteration being installed, the first three spaces under DESCRIPTION (ITEM, STATE OF ALTERATION, EFFECTS OF ALTERATION) on the Equipment Alteration log (Page 3 of 3) must be completed. See example below:

DESCRIPTION				* I/C
ITEM	STATE OF ALTERATION		EFFECTS OF ALTERATION UPON SYSTEM / EQUIPMENT	
	FROM	TO		
LINK TB24-21-734	CLOSED	OPEN	ISOLATES THE REMOTE START FUNCTIONS OF MUP-1A	C
JUMPER TB24-28-734 TB24-29-734	NO JUMPER	JUMPERED	PROVIDES TRIP SIGNAL TO MUP-1A LOGIC	C
HANGER MUH-999	INSTALLED	REMOVED	MAKES THE SECTION OF THE MAKE-UP SYSTEM BETWEEN VALVE MUV-55 TO MUV 65 INOPERABLE.	I

***** **WORKING COPY** ***** **NU 0341602**

WORK REQUEST NUMBER		PROCEDURE NUMBER		MAR NUMBER					
DESCRIPTION				ALTERATION			RESTORATION		
ITEM	STATE OF ALTERATION FROM	STATE OF ALTERATION TO	EFFECTS OF ALTERATION UPON SYSTEM / EQUIPMENT	*I /C	PERFORMED BY INIT/DATE	VERIFIED BY INIT/DATE	*I /C	PERFORMED BY INIT/DATE	VERIFIED BY INIT/DATE

* INDEPENDENT / CONCURRENT VERIFICATION: Indicate method of VERIFICATION to be applied (I/C). If the specific type of VERIFICATION method is not specified in the Work Request/Procedure(s), either INDEPENDENT and/or CONCURRENT VERIFICATIONS may be used. The Work Supervisor must determine the appropriate type of VERIFICATION to be performed where questions arise.

WORK Completed By________________ Date __/__/__ Supervisor Concurrence ________________ Date __/__/__

NSSOD or Designee Acknowledgement ________________ __/__/__

Personnel Qualifications:

NLA State who is the lead person responsible for the activity

NLA Discuss assignments

NLA Verify everyone is qualified to do their assignment

Work Area Control:

NLA Clearances necessary/ready

NLA FME considerations/cleanliness

PERSONNEL Safety Analysis:

NLA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos etc.

NLA RWP requirements, ALARA, HP Briefing

Nuclear Safety Analysis:

NLA Could this cause: Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Will the reactor be protected?

N/A Could this cause: Trip or runback?

NLA Is there a potential to damage equipment?

Ask each individual in attendance:

NLA Do you understand the evolution and your part in it?

NLA Do you have any questions?

Doug L. [signature] 10-31-97

INFREQUENTLY PERFORMED ACTIVITY CHECK LIST

The DNPO or his designee is required to brief personnel on management expectations prior to the performance of infrequently performed activities. As a minimum, the following areas should be discussed:

- N/A The need to possibly perform a simulator validation prior to the activity.
- The need for exercising caution and conservatism during the activity, particularly when uncertainties or unexpected alarms are encountered.
- Emphasis on maintaining the highest margins of safety to place proper perspective on any sense of urgency that may otherwise prevail.
- Assigned responsibilities for the activity and any deviation from normal shift duties and accountabilities.
- The need for open communications.
- Application of lessons learned from pertinent in-house and industry operating experience to assist operations in internalizing these lessons.
- The need to stop the activity when unexpected conditions arise or unexpected plant response is experienced.
- When questionable and unclear areas or issues are encountered, the expectation is that additional management and technical personnel will be consulted for assistance in making decisions.

The DNPO designee must be a line manager with authority to oversee the infrequently performed activity. This authority includes control of the pace of the work and the resolution or escalation of problems encountered.

10-31-97

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection Date: 10-31-97

Description of the activity:

AEA State why the activity was performed

AEA Did a Pre-Job brief occur?

What went Right:

AEA Adequate personnel, communication, department interface and team work.

AEA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

AEA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

AEA RWP requirements, ALARA

NUCLEAR Safety Analysis

AEA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

AEA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

HJA Were qualifications adequate for the assignments?

HJA Lead person knowledgeable about the activity?

Ask each individual in attendance:

HJA Did you understand the activity and your part in it's completion?

HJA Did you have any questions during the performance?

What went Wrong

HJA Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

HJA Equipment Failure - Mechanical, electrical

HJA Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

[illegible] Documentation: NUPOST, PCs, REA. OCRs

HJA Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Verbal Instructions to PSC In-service Inspection Manual N604-005. / All safety precaution for the job.
NCR# EN604-001 - PROTRUDING WIRE

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-1-97

Description of the activity:

NRA State why the activity was performed

NRA Did a Pre-Job brief occur?

What went Right:

NRA Adequate personnel, communication, department interface and team work.

NRA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

NRA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

NRA RWP requirements, ALARA

NUCLEAR Safety Analysis

NRA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

NRA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

- Were qualifications adequate for the assignments?
- Lead person knowledgeable about the activity?

Ask each individual in attendance:

- Did you understand the activity and your part in it's completion?
- Did you have any questions during the performance?

What went Wrong

- Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress
- Equipment Failure - Mechanical, electrical
- Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

- Documentation: NUPOST, PCs, REA. OCRs
- Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Safety - 100% tie off / operations of hydr rams, platforms
NCR# EN604-002 - CONCRETE CRACKS

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-3-97

Description of the activity:

ARA State why the activity was performed

ARA Did a Pre-Job brief occur?

What went Right:

ARA Adequate personnel, communication, department interface and team work.

ARA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

ARA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

ARA RWP requirements, ALARA

NUCLEAR Safety Analysis

ARA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

ARA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

HRH Were qualifications adequate for the assignments?

HRH Lead person knowledgeable about the activity?

Ask each individual in attendance:

HRH Did you understand the activity and your part in it's completion?

HRH Did you have any questions during the performance?

What went Wrong

HRH Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

HRH Equipment Failure - Mechanical, electrical

HRH Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

______ Documentation: NUPOST, PCs, REA. OCRs

HRH Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Communications

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection   Date: 11-4-97

Description of the activity:

[initials] State why the activity was performed

[initials] Did a Pre-Job brief occur?

What went Right:

[initials] Adequate personnel, communication, department interface and team work.

[initials] Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

[initials] Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

N/A RWP requirements, ALARA

NUCLEAR Safety Analysis

[initials] Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

[initials] Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

[initials] Were qualifications adequate for the assignments?

[initials] Lead person knowledgeable about the activity?

Ask each individual in attendance:

[initials] Did you understand the activity and your part in it's completion?

[initials] Did you have any questions during the performance?

What went Wrong

[initials] Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

[initials] Equipment Failure - Mechanical, electrical

[initials] Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

______ Documentation: NUPOST, PCs, REA. OCRs

[initials] Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Continue work safe. Flag off area under work platform near Equip. Hatch

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-5-97

Description of the activity:

HLA State why the activity was performed

HLA Did a Pre-Job brief occur?

What went Right:

HLA Adequate personnel, communication, department interface and team work.

HLA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

HLA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

HLA RWP requirements, ALARA

NUCLEAR Safety Analysis

HLA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

HLA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

N/A Were qualifications adequate for the assignments?

N/A Lead person knowledgeable about the activity?

Ask each individual in attendance:

N/A Did you understand the activity and your part in it's completion?

N/A Did you have any questions during the performance?

What went Wrong

N/A Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

N/A Equipment Failure - Mechanical, electrical

N/A Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

_____ Documentation: NUPOST, PCs, REA. OCRs

N/A Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Safety concerns on falling objects

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-6-97

Description of the activity:

HRA State why the activity was performed

HRA Did a Pre-Job brief occur?

What went Right:

HRA Adequate personnel, communication, department interface and team work.

HRA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

HRA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

HRA RWP requirements, ALARA

NUCLEAR Safety Analysis

HRA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

HRA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

[initials] Were qualifications adequate for the assignments?

[initials] Lead person knowledgeable about the activity?

Ask each individual in attendance:

[initials] Did you understand the activity and your part in it's completion?

[initials] Did you have any questions during the performance?

What went Wrong

[initials] Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

[initials] Equipment Failure - Mechanical, electrical

[initials] Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

________ Documentation: NUPOST, PCs, REA. OCRs

[initials] Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Heights Safety

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-2-97

Description of the activity:

HLA State why the activity was performed

HLA Did a Pre-Job brief occur?

What went Right:

HLA Adequate personnel, communication, department interface and team work.

HLA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

HLA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

N/A RWP requirements, ALARA

NUCLEAR Safety Analysis

HLA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

HLA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

HRA Were qualifications adequate for the assignments?

HRA Lead person knowledgeable about the activity?

Ask each individual in attendance:

HRA Did you understand the activity and your part in it's completion?

HRA Did you have any questions during the performance?

What went Wrong

HRA Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

HRA Equipment Failure - Mechanical, electrical

HRA Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

______ Documentation: NUPOST, PCs, REA. OCRs

HRA Corrective action: System engineering contacted, took compensatory action, etc.

Comments: None

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection Date: 11-8-97

Description of the activity:

[initials] State why the activity was performed

[initials] Did a Pre-Job brief occur?

What went Right:

[initials] Adequate personnel, communication, department interface and team work.

[initials] Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

[initials] Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

N/A RWP requirements, ALARA

NUCLEAR Safety Analysis

[initials] Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

[initials] Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

______ Were qualifications adequate for the assignments?

______ Lead person knowledgeable about the activity?

Ask each individual in attendance:

______ Did you understand the activity and your part in it's completion?

______ Did you have any questions during the performance?

What went Wrong

______ Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

______ Equipment Failure - Mechanical, electrical

______ Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

______ Documentation: NUPOST, PCs, REA. OCRs

______ Corrective action: System engineering contacted, took compensatory action, etc.

Comments: None

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection Date: 11-10-97

Description of the activity:

[initials] State why the activity was performed

[initials] Did a Pre-Job brief occur?

What went Right:

[initials] Adequate personnel, communication, department interface and team work.

[initials] Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

[initials] Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

[initials] RWP requirements, ALARA

NUCLEAR Safety Analysis

N/A Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

[initials] Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

- Were qualifications adequate for the assignments?
- Lead person knowledgeable about the activity?

Ask each individual in attendance:

- Did you understand the activity and your part in it's completion?
- Did you have any questions during the performance?

What went Wrong

- Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress
- Equipment Failure - Mechanical, electrical
- Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

- Documentation: NUPOST, PCs, REA. OCRs
- Corrective action: System engineering contacted, took compensatory action, etc.

Comments: None

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection Date: 11-11-97

Description of the activity:

N/A State why the activity was performed

N/A Did a Pre-Job brief occur?

What went Right:

N/A Adequate personnel, communication, department interface and team work.

N/A Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

N/A Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

N/A RWP requirements, ALARA

NUCLEAR Safety Analysis

N/A Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

N/A Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

NLA Were qualifications adequate for the assignments?

NLA Lead person knowledgeable about the activity?

Ask each individual in attendance:

NLA Did you understand the activity and your part in it's completion?

NLA Did you have any questions during the performance?

What went Wrong

NLA Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

NLA Equipment Failure - Mechanical, electrical

NLA Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

______ Documentation: NUPOST, PCs, REA. OCRs

NLA Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Safety

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-12-97

Description of the activity:

NLA State why the activity was performed

NLA Did a Pre-Job brief occur?

What went Right:

NLA Adequate personnel, communication, department interface and team work.

NLA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

NLA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

NLA RWP requirements, ALARA

NUCLEAR Safety Analysis

NLA Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

NLA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

NLA Were qualifications adequate for the assignments?

NLA Lead person knowledgeable about the activity?

Ask each individual in attendance:

NLA Did you understand the activity and your part in it's completion?

NLA Did you have any questions during the performance?

What went Wrong

NLA Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

NLA Equipment Failure - Mechanical, electrical

NLA Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

________ Documentation: NUPOST, PCs, REA. OCRs

________ Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Notify HP before and after working in Tendon Gallery

POST-JOB BRIEFING FORM

Activity: GR-3 Tendon Inspection Date: 11-13-97

Description of the activity:

NLA State why the activity was performed

NLA Did a Pre-Job brief occur?

What went Right:

NLA Adequate personnel, communication, department interface and team work.

NLA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

NLA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

NLA RWP requirements, ALARA

NUCLEAR Safety Analysis

N/A Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

NLA Clearance adequate for the activity

N/A If FME was established, any problems encountered?

Personnel Qualifications:

Were qualifications adequate for the assignments?

Lead person knowledgeable about the activity?

Ask each individual in attendance:

Did you understand the activity and your part in it's completion?

Did you have any questions during the performance?

What went Wrong

Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

Equipment Failure - Mechanical, electrical

Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

Documentation: NUPOST, PCs, REA. OCRs

Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Contain grease from draining bottom vents

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection **Date:** 11-14-97

Description of the activity:

AJA State why the activity was performed

AJA Did a Pre-Job brief occur?

What went Right:

AJA Adequate personnel, communication, department interface and team work.

AJA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

AJA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

N/A RWP requirements, ALARA

NUCLEAR Safety Analysis

N/A Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

AJA Clearance adequate for the activity

AJA If FME was established, any problems encountered?

Personnel Qualifications:

- Were qualifications adequate for the assignments?
- Lead person knowledgeable about the activity?

Ask each individual in attendance:

- Did you understand the activity and your part in it's completion?
- Did you have any questions during the performance?

What went Wrong

- Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress
- Equipment Failure - Mechanical, electrical
- Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

- Documentation: NUPOST, PCs, REA. OCRs
- Corrective action: System engineering contacted, took compensatory action, etc.

Comments: Detension 5/H26 - communication between both crews working on the same tendon.

POST-JOB BRIEFING FORM

Activity: CR-3 Tendon Inspection Date: 11-15-97

Description of the activity:

HLA State why the activity was performed

HLA Did a Pre-Job brief occur?

What went Right:

HLA Adequate personnel, communication, department interface and team work.

HLA Tools - preplanning, procedure, STAR and peer checking.

PERSONNEL Safety Analysis

HLA Discuss the personnel safety hazards associated with the activity: Electrical, Mechanical, Chemical, Confined space, Safety at heights, Asbestos, etc.

N/A RWP requirements, ALARA

NUCLEAR Safety Analysis

N/A Review barrier in place which prevents Reactivity excursion, Loss of decay heat, Loss of RCS/Containment integrity, Radioactive release

N/A Was the reactor protected?

Work Area Control:

HLA Clearance adequate for the activity

HLA If FME was established, any problems encountered?

Personnel Qualifications:

[initials] Were qualifications adequate for the assignments?

[initials] Lead person knowledgeable about the activity?

Ask each individual in attendance:

[initials] Did you understand the activity and your part in it's completion?

[initials] Did you have any questions during the performance?

What went Wrong

[initials] Human error-Time pressure, distractive environment, high work leads, first time evolution, first working day after days off, 1/2 hour after wake up/meal, vague guidance, over confidence, imprecise communication, work stress

[initials] Equipment Failure - Mechanical, electrical

[initials] Environmental - Leak, spill, contamination, weather, natural causes

Follow-ups

______ Documentation: NUPOST, PCs, REA. OCRs

[initials] Corrective action: System engineering contacted, took compensatory action, etc.

Comments: None

Florida Power CORPORATION

INTEROFFICE CORRESPONDENCE

Procurement Quality	SA2D	240-4426
OFFICE	MAC	TELEPHONE

SUBJECT: **Precision Surveillance Corporation Surveillance**

TO: **Matt Denny** DATE: **December 30, 1997**

Attached for your records and inclusion into the Reactor Building Tendon Inspection Work Package, NU 0341602, is the Precision Surveillance Corporation surveillance performed December 5, 1997 by Procurement Quality.

No concerns were noted as a result of the surveillance.

If you have any questions, I can be reached at 352/563-4426.

Sincerely,

Deborah K. Borland

Deborah K. Borland
Senior QA Specialist

cc: J. Baumstark
H. Hendrickson, PSC
G. Oberndorfer

SURVEILLANCE PLAN

DESCRIPTION: **On site surveillance of Precision Surveillance Corporation inspection and test activities.**

SUPPLIER: **Precision Surveillance Corporation (PSC)**

Ref. Documents: Florida Power Corporation (FPC) Contract #NO1309AD which includes SP-182 and was implemented in the PSC In Service Inspection Manual #N604. Site work is controlled under Work Package NU 0341602.

BACKGROUND: PSC was selected to perform the 20th year (6th period) reactor building tendon inspections at Crystal River Unit 3 in March of 1997. The work started in earnest during the fourth quarter of 1997 and this surveillance was performed December 5, 1997. FPC Quality Control has performed periodic oversights of the PSC activities since their arrival. The oversight reports are not included in this report.

Ref. Requirements: **Nuclear Procurement & Storage Manual Section 7.8.3 and 7.5.1.6, PSC Quality Assurance Manual, Revision 2, dated 6/28/91**

INTRODUCTION: PSC has a total of eighteen (18) people on site; thirteen (13) laborers, two (2) supervisors and three (3) Quality Control Inspectors. Two FPC Inspectors were recently trained to supplement the PSC inspection staff. In the PSC trailer, staged by the reactor building, is the Heise Load cell used each day to calibrate the test/lift off pressure gauges.

VERIFY THE FOLLOWING ACTIVITIES/CHARACTERISTICS:

1) Review the work package for the appropriate sign offs. Verify non-conformance's are generated and controlled per the PSC QA Manual.

Contract #NO1309AD included FPC Surveillance Procedure SP-182 as Appendix "C". The SP has been incorporated into the PSC Controlled Manual N604. This document was submitted and approved by FPC. Manual N604 clearly delineates inspection criteria, test and inspection locations and records results for the 20th Year Reactor Building Tendon Surveillance In-Service Inspections. The official working/controlled copy of N604 was locked away at the time of the surveillance, therefore, a package review was not performed. If deficiencies are found during tendon test and inspections PSC will generate a nonconformance per PSC procedure QA 9.0 for FPC's evaluation and FPC will generate a precursor card (PC). Several tendon test and inspection PC's were considered reportable to the NRC and have been handled by the PC evaluation process. Precursor Card Report #97-7666 was reviewed as a representative sample.

2) Review PSC Inspector qualifications and certifications for compliance to the QA Manual.

As required by the NP&SM, PSC Inspector qualification and certification packages were submitted, reviewed and accepted by FPC Quality Control prior to the individuals performing work on site. Qualification packages were reviewed for the following individuals and found to be in compliance with the QA Manual;

1) Daniel O'Shea
2) Kenneth Nance
3) Peter Cave
4) Orlando Melito

The qualification and certification packages appear to comply with the requirements of ANSI N45.2.6, 1978 for a Level II Inspector.

3) Review field equipment and certification for compliance to the QA Manual and traceability to NIST.

Instrument calibration records and traceability to NIST was reviewed and found to be adequately implemented on the following instruments;

1) Heise Load Cell #S7-8462
2) 1" Micrometer #QC 78
3) Optical Comparitor #MR-1 and GRCS-1
4) Thermometers #PK 63, 64 and #SM-5, 6

Observed the Heise load cell, serial number S7-8462, master load cell for calibration of pressure gauges in the PSC trailer. The Heise range was 0-10,000 psi and the calibration due date was 10/7/00. Two (2) torque wrenches used by PSC were checked out of FPC's calibration laboratory.

4) Describe how materials are procured and processed for site use.

Materials used on the job was either supplied by FPC or was brought in through our warehouse with FPC Receipt Inspection. Observed several drums of oil/grease staged on the southeast corner of the berm for use by PSC. They were safety related part #0001430382, VISC part #2090 P-4, Visconorust. Part number 2090 P-4 is specified in Work Package NU 0341602 for use. Pink issue documents for shims and gaskets were located in the PSC trailer document control locker adjacent to the Reactor Building. Reviewed QCI#156321 associated with PO#F810235D for shims.

5) On site PSC Tendon Surveillance summary:

In summary, The PSC Inspection personnel and test equipment were appropriately calibrated, qualified and certified. The work package was controlled and non conformance's generated as required. No deficiencies were noted.

Contacts during surveillance: Ken Mayer, Engineering, NLI; Joe Eiola, QC Inspector, FPC; Matt Denny, ISI Eng, FPC; Harry Hendrickson, PSC

Prepared by:
PQA Representative: _D. K. Borland____________ Date:_12/05/97______

Conduced by :
PQA Representative: D.K. Borland **Date:_12/30/97______**

SHIPPING RELEASE AND PACKING LIST

QUALITY CONTROL DOCUMENTATION

PSC Formerly Inryco Surveillance

Customer: FLORIDA POWER CORP	Shipment No. N/A
Project: CRYSTAL RIVER - UNIT # 3	Contract: NC04
Prepared by: H. HENDRICKSON	Fabricator: N/A
Inspected by: Bill D. Carter	Date: 12-11-97 Page 1 of 1

Documentation to satisfy the Quality Assurance requirements have been reviewed and found acceptable.

SIGNED H.F. Hendrickson DATE 12-11-97

PSC QUALITY ASSURANCE REPRESENTATIVE

QUANTITY	PART NO.	DESCRIPTION
1 EA	N/A	1200 TON HYDR. RAM (#9501)

1 Total Pieces

N/A Total Weight

QUALITY ASSURANCE DOCUMENTATION	Precision Surveillance Corporation
CERTIFICATE OF COMPLIANCE	

Project FPC - CRYSTAL RIVER, UNIT #3 Contract NC04 Date 12-11-97

Material Identification 1 EA. HYDR. RAM, 1200 TON # 9501

Purchase Order No. FPC # N01309AD

Specification and Revision No. FPC-SP-182, REV. 12

Drawing and Revision No. N/A

Procurement Requirements MET BY ATTACHED CALIBRATION

(met by material) —

Deviations NONE

Resolution N/A

Disposition N/A

Non-Conformance NONE

Q.A. Release for NCR N/A

Deviations and Non-Conformances shall be attached to this form.
N/A to be written in for Not Applicable; all blanks shall be filled in.

This is to certify that the above material has been fabricated and inspected in compliance with the specified drawings, procedures, specifications, codes, purchase order requirements, PSC Quality Assurance Manual Revision 2 Dated 6/28/91 and the attendant quality programs.

Vendor PRECISION SURVEILLANCE CORP Authorized Agent H. F. Hendrickson
Date 12-11-97 Title MGR, Q.A.

PSC QUALITY CONTROL ACCEPTANCE

Name & Title Bill D. Carter Gen QC Date 12-11-97

OWNER OR AUTHORIZED AGENT INSPECTION WAIVER

Shipment Final Inspection Waived By N/A Date N/A

Agency N/A Title N/A

Supplier's Authorized Representative H. F. Hendrickson

EFFECTIVE DATE 1-1-81	PREV.REV. △	REVISION △	PAGE 1 of 1

RAM/JACK CALIBRATION RECORD FORM 12.8.G

PSC Formerly Inryco Surveillance

PROJECT CRYSTAL RIVER CONTRACT/PART NO. N604

Jack Description DUDGEON Size 1200 Tons Register No. 9501

Theoretical Ram Area 369.0 Max. Pressure 5200 PSI

Calibrating Device TELEDYNE Register No. 4734 Constant 32991.2

Calibrating Gauge HEISE Register No. 59-27100 Date (DOE CAL) 12-4-00

Raw Data By Bill D. Carter 12-11-97

Mean Ram Area 368.689 sq.in. K= 1.554 Kips

Computed By [signature]

Title Engineer Trainee Date 12/11/97

WITNESS N/A

Agency N/A Date N/A

QC Check H. F. Hendrickson

Title MGR., Q.A. Date 12-11-97

Target PSI	Gauge Reading PSI	Load Cell Readout	COMMENTS
1000	1003	-11.30	RUN 1 POSITION 1½"
1500	1504	-16.94	
2000	2003	-22.56	
2500	2504	-28.20	
3000	3004	-33.78	
3500	3505	-39.36	
4000	4004	-44.94	
4500	4505	-50.54	
5000	5004	-56.10	
1000	1005	-11.20	RUN 2 POSITION 2½"
1500	1504	-16.78	
2000	2007	-22.38	
2500	2505	-27.94	
3000	3004	-33.48	
3500	3505	-39.06	
4000	4008	-44.64	
4500	4505	-50.16	
5000	5006	-55.72	
1000	1004	-11.20	RUN 3 POSITION 3½"
1500	1507 8 BC 12-11-97	-16.86	
2000	2008	-22.48	
2500	2505	-28.06	
3000	3007	-33.68	
3500	3505	-39.26	
4000	4004	-44.88	
4500	4504	-50.44	
5000	5002	-56.00	

JACK CALIBRATION - LINEAR REGRESSION ANALYSIS

PROJECT CRYSTAL RIVER | CONTRACT NO. N604

JACK DESCRIPTION: DUDGEON TONS: 1200 | REGISTER NO.: 9501 2634 12/11/97

THEORETICAL RAM AREA (sq.in): 369.0 | MAX PRESSURE (psi): 5200

CALIBRATING DEVICE USED: TELEDYNE REGISTER NO.: 4734 | CONSTANT= 32991.2

CALIBRATING GAUGE DESCRIPTION: HEISE | REGISTER NO.: S9-27100 2634 12/11/97

ACTUAL GAUGE READING (psi)	INPUT LOAD CELL READOUT	COMPUTED FORCE (k)
1003	11.30	372.801
1504	16.94	558.871
2003	22.56	744.281
2504	28.20	930.352
3004	33.78	1114.443
3505	39.36	1298.534
4004	44.94	1482.625
4505	50.54	1667.375
5004	56.10	1850.806
1005	11.20	369.501
1504	16.78	553.592
2007	22.38	738.343
2505	27.94	921.774
3004	33.48	1104.545
3505	39.06	1288.636
4008	44.64	1472.727
4505	50.16	1654.839
5006	55.72	1838.270
1004	11.20	369.501
1507	16.86	556.232
2008	22.48	741.642
2505	28.06	925.733
3007	33.68	1111.144
3505	39.26	1295.235
4004	44.88	1480.645
4504	50.44	1664.076
5002	56.00	1847.507

* - THESE READINGS HAVE BEEN OMITTED FROM THE FINAL COMPUTATIONS

ERRORS IN JACK CALIBRATION
- ERROR IN STANDARD .... 0.0100 ksi
- INTERPOLATION IN GAUGE .... 0.0000 ksi
- ACCURACY OF GAUGE .... 0.0000 ksi

ERRORS IN GAUGE CALIBRATION
- INTERPOLATION IN MASTER .... 0.0000 ksi
- INTERPOLATION IN FIELD GAUGE .... 0.0050 ksi
- ACCURACY OF MASTER .... 0.0100 ksi
- ACCURACY OF FIELD GAUGE .... 0.0275 ksi

ERRORS IN FIELD USE OF GAUGE
- INTERPOLATION ERROR .... 0.0050 ksi
- ACCURACY ERROR .... 0.0275 ksi

MAXIMUM GAUGE READING USED .... 5.0060 ksi

** FORCE (k) = 368.689 (sq.in.) X GAUGE READING (ksi) 1.554 (k) **

CORRELATION = 0.99996173 N/NO= 1.0000 (NOT < .66667)

MAXIMUM ERROR RATIO IN JACK .... .0069

MAXIMUM ERROR RATIO IN GAUGE .... .0084

MAXIMUM TOTAL ERROR RATIO .... .0109

COMPUTED BY: [signature] DATE: 12/11/97 CHECKED BY: H.T. Hendrickson DATE: 12/11/97

Precision Surveillance Corporation

3468 Watling Road
East Chicago, IN 46312
219-397-5826

Precision Surveillance Corporation
3468 Watling Road, East Chicago, IN 46312

Shipping Ticket

BILL TO CUSTOMER YES ☐ NO ☐	BILL TO:	☐ BASE CONTRACT	☐ EXTRA	CONTRACT NUMBER N604	PAGE OF PAGE
		TERMS	COLLECT	PARTS NO.	DATE SHIPPED
				TOTAL WEIGHT	

SHIP TO: (SAME AS BILL TO UNLESS OTHERWISE INDICATED)
PRECISION SURVEILLANCE CORP. c/o FLORIDA POWER CORP.
CRYSTAL RIVER ENERGY COMPLEX - WAREHOUSE #3
15760 WEST POWER LINE STREET
CRYSTAL RIVER, FL 34428

TAG: TAGGING INFORMATION; CUSTOMER P.O. NUMBER; INVOICE REG.

MATERIAL FOR:

SHIPPING DATE: 12/4/97 via Esscathol

REQUEST DATE

ENTRY DATE | ENTRY TIME

Special Shop Instructions

JOB PHONE

GROSS B/L WEIGHT

F.O.B. POINT

INSPECTION

ITEM	QUANTITY	UNITS	DESCRIPTION	NET WEIGHT
1	1	EA	1200 TON HYDR. RAM #9501	1,600
2	1	SKID	HYDR. PUMP + RAM ACCESSORIES	200
3				
4				
5				
6				
7			FPC - P.O. # N01309AD	
8				
9			F810235D	
10				
11				
12				

SHIPPING RELEASE AND PACKING LIST

QUALITY CONTROL DOCUMENTATION

PSC Formerly Inryco Surveillance

Customer: FLORIDA POWER CORP	Shipment No. N/A
Project: CRYSTAL RIVER - UNIT # 3	Contract: NC04
Prepared by: H. HENDRICKSON	Fabricator: N/A
Inspected by: Bill D. Carter	Date: 12-11-97 Page 1 of 1

Documentation to satisfy the Quality Assurance requirements have been reviewed and found acceptable.

SIGNED H. F. Hendrickson DATE 12-11-97

PSC QUALITY ASSURANCE REPRESENTATIVE

QUANTITY	PART NO.	DESCRIPTION
1 EA	N/A	1200 TON HYDR. RAM (#9501)

1 Total Pieces

N/A Total Weight

QUALITY ASSURANCE DOCUMENTATION	Precision Surveillance Corporation
CERTIFICATE OF COMPLIANCE	

Project FPC-CRYSTAL RIVER, UNIT #3 Contract NC04 Date 12-11-97

Material Identification 1 EA. HYDR. RAM, 1200 TON # 9501

Purchase Order No. FPC # N01309AD

Specification and Revision No. FPC-SP-182, REV. 12

Drawing and Revision No. N/A

Procurement Requirements MET BY ATTACHED CALIBRATION

(met by material) —

Deviations NONE

Resolution N/A

Disposition N/A

Non-Conformance NONE

Q.A. Release for NCR N/A

Deviations and Non-Conformances shall be attached to this form.
N/A to be written in for Not Applicable; all blanks shall be filled in.

This is to certify that the above material has been fabricated and inspected in compliance with the specified drawings, procedures, specifications, codes, purchase order requirements, PSC Quality Assurance Manual Revision 2 Dated 6/28/91 and the attendant quality programs.

Vendor PRECISION SURVEILLANCE CORP Authorized Agent H. F. Hendrickson

Date 12-11-97 Title MGR, Q.A.

PSC QUALITY CONTROL ACCEPTANCE

Name & Title Bill D Carter CONS QC Date 12-11-97

OWNER OR AUTHORIZED AGENT INSPECTION WAIVER

Shipment Final Inspection Waived By N/A Date N/A

Agency N/A Title N/A

Supplier's Authorized Representative H. F. Hendrickson

RAM/JACK CALIBRATION RECORD FORM 12.8.G

PSC Formerly Inryco Surveillance

PROJECT CRYSTAL RIVER CONTRACT/PART NO. N604

Jack Description DUDGEON Size 1200 Tons Register No. 9501

Theoretical Ram Area 369.0 Max. Pressure 5200 PSI

Calibrating Device TELEDYNE Register No. 4734 Constant 32991.2

Calibrating Gauge HEISE Register No. 59-27100 DUE CAL Date 12-4-00

Raw Data By Bill D. Carter 12-11-97

Mean Ram Area 368.689 sq.in. K= 1.554 Kips

Computed By [signature]

Title Engineer Trainee Date 12/11/97

WITNESS N/A

Agency N/A Date N/A

QC Check H. F. Hendrickson

Title MGR. Q. A. Date 12-11-97

Target PSI	Gauge Reading PSI	Load Cell Readout	COMMENTS
1000	1003	-11.30	RUN 1 POSITION 1½″
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4000	4004	-44.94	
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3000	3004	-33.48	
3500	3505	-39.06	
4000	4008	-44.64	
4500	4505	-50.16	
5000	5006	-55.72	
1000	1004	-11.20	RUN 3 POSITION 3½″
1500	1507 BC 12-11-97	-16.86	
2000	2008	-22.48	
2500	2505	-28.06	
3000	3007	-33.68	
3500	3505	-39.26	
4000	4004	-44.88	
4500	4504	-50.44	
5000	5002	-56.00	

JACK CALIBRATION - LINEAR REGRESSION ANALYSIS

PROJECT CRYSTAL RIVER — CONTRACT NO. N604

JACK DESCRIPTION: DUDGEON TONS: 1200 — REGISTER NO.: 9501 UEH 12/11/9?

THEORETICAL RAM AREA (sq.in): 369.0 — MAX PRESSURE (psi): 5200

CALIBRATING DEVICE USED: TELEDYNE REGISTER NO.: 4734 — CONSTANT= 32991.2

CALIBRATING GAUGE DESCRIPTION: HEISE — REGISTER NO.: S9-27100 UEH 12/11/9?

...............INPUT..............		
ACTUAL GAUGE READING (psi)	LOAD CELL READOUT	COMPUTED FORCE (k)
1003	11.30	372.801
1504	16.94	558.871
2003	22.56	744.281
2504	28.20	930.352
3004	33.78	1114.443
3505	39.36	1298.534
4004	44.94	1482.625
4505	50.54	1667.375
5004	56.10	1850.806
1005	11.20	369.501
1504	16.78	553.592
2007	22.38	738.343
2505	27.94	921.774
3004	33.48	1104.545
3505	39.06	1288.636
4008	44.64	1472.727
4505	50.16	1654.839
5006	55.72	1838.270
1004	11.20	369.501
1507	16.86	556.232
2008	22.48	741.642
2505	28.06	925.733
3007	33.68	1111.144
3505	39.26	1295.235
4004	44.88	1480.645
4504	50.44	1664.076
5002	56.00	1847.507

* - - THESE READINGS HAVE BEEN OMITTED FROM THE FINAL COMPUTATIONS

ERRORS IN JACK CALIBRATION
- ERROR IN STANDARD .... 0.0100 ksi
- INTERPOLATION IN GAUGE .... 0.0000 ksi
- ACCURACY OF GAUGE .... 0.0000 ksi

ERRORS IN GAUGE CALIBRATION
- INTERPOLATION IN MASTER .... 0.0000 ksi
- INTERPOLATION IN FIELD GAUGE .... 0.0050 ksi
- ACCURACY OF MASTER .... 0.0100 ksi
- ACCURACY OF FIELD GAUGE .... 0.0275 ksi

ERRORS IN FIELD USE OF GAUGE
- INTERPOLATION ERROR .... 0.0050 ksi
- ACCURACY ERROR .... 0.0275 ksi

MAXIMUM GAUGE READING USED .... 5.0060 ksi

** FORCE (k) = 368.689 (sq.in.) X GAUGE READING (ksi) 1.554 (k) **

CORRELATION = 0.99996173 N/NO= 1.0000 (NOT < .66667)

MAXIMUM ERROR RATIO IN JACK .... .0069

MAXIMUM ERROR RATIO IN GAUGE .... .0084

MAXIMUM TOTAL ERROR RATIO .... .0109

COMPUTED BY: [signature] DATE: 12/11/94 CHECKED BY: U.K. [signature] 12/11/94

Precision Surveillance Corporation
3468 Watling Road, East Chicago, IN 46312

Shipping Ticket

Precision Surveillance Corporation
3468 Watling Road
East Chicago, IN 46312
219-397-5826

BILL TO CUSTOMER YES ☐ NO ☐	BILL TO:	☐ BASE CONTRACT ☐ EXTRA	CONTRACT NUMBER N604	PAGE OF PAGE
		TERMS / COLLECT	PARTS NO.	DATE SHIPPED
			TOTAL WEIGHT	

SHIP TO: (SAME AS BILL TO UNLESS OTHERWISE INDICATED)
PRECISION SURVEILLANCE CORP. c/o FLORIDA POWER CORP.
CRYSTAL RIVER ENERGY COMPLEX - WAREHOUSE #3
15760 WEST POWER LINE STREET
CRYSTAL RIVER, FL 34428

TAG — TAGGING INFORMATION:
CUSTOMER P.O. NUMBER:
INVOICE REG.:
MATERIAL FOR:

SHIPPING DATE: 12/4/97 via Essential
REQUEST DATE:
ENTRY DATE:
ENTRY TIME:
Special Shop Instructions:

ITEM	QUANTITY	UNITS	DESCRIPTION	NET WEIGHT
1	1	EA	1200 TON HYDR. RAM #9501	1,600
2	1	SKID	HYDR. PUMP + RAM ACCESSORIES	200
3				
4				
5				
6				
7			FPC - P.O. # N01309AD	
8				
9				
10				
11				
12				

JOB PHONE
GROSS B/L WEIGHT
F.O.B. POINT
INSPECTION

FAX COVER SHEET

Florida Power CORPORATION

TO:	Harry Hendrickson
COMPANY:	Precision Surveillance Corp
FAX NUMBER:	219/397-5867
TELEPHONE:	219/397-5826
DATE:	December 8, 1997

Please forward FPC the NIST traceable document for the following equipment that PSC has brought on site at Crystal River Unit 3 for job number N604/WR 034162, contract NU1309AD.

1) Heise Load Cell # S7-8462
2) 1" Micrometer # QC 78
3) Optical Comparator # MR-1, OCBB
4) Optical Comparator # GRCS-1
5) Pocket Thermometer #PK 63
6) Pocket Thermometer #PK 64
7) Surface Thermometer #SM-5
8) Surface Thermometer #SM-6

If the piece of equipment is calibration through a series of secondary standards going back to the NIST standard, please identify the flow path and final linking NIST document. The NIST document can be the standard cover page which list the NIST number.

Thank you for the assistance and cooperation.

Call me if you have any questions at 352/563/4426. My FAX is 352/563-4658.

(You will receive _0_ additional pages)

****

Florida Power Corporation
15760 W. Powerline Street (SA2D)
Crystal River, Florida 34428-6708

Deborah K. Borland (352) 563-4426 FAX (352) 563-4658

FACSIMILE TRANSMISSION

PSC
Precision Surveillance Corporation
3468 Watling Street
East Chicago, IN 46312
(219)397-5826
Fax (219)397-5867

Date: December 10, 1997

Total Pages including Cover Sheet: 12

To: Deborah K. Borland

Company: Florida Power Corporation

Facsimile Number: 352-563-4658

Telephone Number: 352-563-4426

From: Harry F. Hendrickson

In response to your 12/8/97 fax regarding NIST traceable documentation for equipment PSC has on site at Crystal River Unit 3, find attached the following:

1) <u>Heise Load Cell #S7-8462</u> ✓

Heise Digital Pressure Gauge #S7-8462 is on site and was calibrated by PSC against dead weight tester #1422 which was calibrated by NIST, refer attached NIST Test #838/256540-96 and #822/256539-96.

2) <u>1" Micrometer #QC 78</u>

1" Micrometer #QC 78 is not on site, it was used by PSC to calibrate Feeler Gauge sets #F-10 and #F-6 which are on site. 1" Micrometer #QC 78 was calibrated by PSC against 0-1" Surveillance Kit #654 which was calibrated by PSC approved vendor who provided attached NIST traceable Test #821/254855-95.

3) <u>Optical Comparator #MR-1, OCBB</u>

#MR-1 is a Master Ruler and is not on site. OCBB is a Optical Comparator and is not on site. #MR-1 and OCBB were used by PSC to calibrate 24" Steel Rulers #R-15 and #R-10 which are on site. #MR-1 was calibrated by PSC approved vendor who provided attached NIST traceable Test #821/25017-93. OCBB was calibrated by PSC against 1.6" Glass Reticle Scale #CRCS-1 which was calibrated by PSC approved vendor who provided attached NIST traceable Test #821/25017-93.

4) <u>Optical Comparator #GRCS-1</u>

#GRCS-1 is a Glass Reticle Scale and is not on site. #GRCS-1 was used by PSC to calibrate Optical Comparators #OC-C and #OC-D which are on site. #GRCS-1 was calibrated by PSC approved vendor who provided attached NIST traceable Test #821/25017-93.

5) <u>Pocket Thermometer #PK 63</u>
6) <u>Pocket Thermometer #PK 64</u>
7) <u>Surface Thermometer #SM-5</u>
8) <u>Surface Thermometer #SM-6</u>

Pocket Thermometer #PK 63, #PK 64 and Surface Thermometer #SM-5, #SM-6 are on site and were calibrated by PSC against Master Thermometer #63F, #64F and #65F which were calibrated by NIST, refer attached NIST Test #257242.

I trust the above and the attached satisfy your request. Sorry took so long - Harry 12/10/97
IF YOU HAVE PROBLEMS WITH THIS TRANSMISSION, CALL (219)397-5826

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
GAITHERSBURG, MARYLAND

P-8522A

REPORT OF CALIBRATION

Pressure & Vacuum Group
A-55 Metrology Building

Requester: Precision Surveillance Corp.
3468 Watling Road
East Chicago, Indiana 46312

Test Instrument Data:

Manufacturer: Mansfield and Green
Model: R-100 2 ... 4/28/96
Serial Number: 1412
Piston Number: 1183s
Cylinder Number: 1183s
Maximun Pressure: 69 MPa
Cylinder Type: Simple
Thermal Expansion Coefficient of Piston: $14.0\times10^{-6}/°C$
Thermal Expansion Coefficient of Cylinder: $14.0\times10^{-6}/°C$
Nominal Piston Area: 6.45×10^{-6} m^2

Test Record Data:

Purchase Order Number and Date: 657 Dated 1/26/96
NIST Identification Number: P-8522A
NIST Test folder Number: TN-838/256540-96
Date Instrument was Received: February 3, 1996
Date Test was Completed: February 28, 1996

Test Conditions:

NIST Standard and Calibration Reference: PG 6, October 1993
Reference Temperature: 23°C
Pressure Fluid: Spinesstic no. 22 oil
Pressure Range of Calibration: 10.7 To 69.3 MPa
Surface Tension of Fluid: 3.093×10^{-2} N/M
Rotation of Weights: Manual
Test Gage Weights Provided by: NIST
The test gage was leveled so that the axis of rotation was vertical.
Reference level of test piston: The reference level is 0.0899 meter below the uppermost surface of the weight loading table. The gage was operated at mid-stroke.

The suggested fit for the effective area of the test gage is

$$\text{Area} = 6.44901\times10^{-6}(1-3.08\times10^{-12}\times P)$$

where P is the nominal pressure in Pa and the area is given in square meters. The total uncertainty is 126 ppm based on the approximate triple standard deviation.

1996 Cal.

U. S. DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
GAITHERSBURG, MD 20899

REPORT OF CALIBRATION

NIST Test Number: 822/256539-96

For: Precision Surveillance Corp.
East Chicago, IN

Items: Twelve (12) Mass Elements
Model #R-100, Serial #1422
Manufacturer: Mansfield and Green, Inc.

The above items have the mass values shown with reference to NIST standards of mass.

Item	Mass (lb)	Expanded* Uncertainty (lb)	Density (g/cm^3)
Wt. 1	9.4996365	0.0000095	6.63
Wt. 2	9.9990931	0.0000095	6.63
Wt. 3	9.9994349	0.0000095	6.63
Wt. 4	9.9992298	0.0000095	6.63
Wt. 5	9.9991108	0.0000095	6.63
Wt. 6	9.9991946	0.0000095	6.63
Wt. 7	9.9991328	0.0000095	6.63
Wt. 8	9.9993511	0.0000095	6.63
Wt. 9	9.9995561	0.0000095	6.63
Piston	0.06251793	0.00000094	7.90
Wt. hanger	0.24802294	0.00000094	7.90
Sleeve	0.18913156	0.00000094	2.70

*The uncertainties reported are those for Grade S weights (ASTM E-617). The weights whose calibration is reported here do not meet Grade S specifications for density and surface finish. The uncertainty is calculated according to NIST Technical Note 1297 implemented on January 1, 1994. The expanded uncertainty is 2 times the combined standard uncertainty.

For the Director
National Institute of Standards and Technology

Zeina Jabbour

Zeina J. Jabbour, Ph.D.
Acoustics, Mass and Vibrations Group
Automated Production Technology Division
Manufacturing Engineering Laboratory

Test Completed: February 28, 1996
Gaithersburg, MD 20899

Note: Mass and associated density values above are appropriate for M_m and ρ_m in Equation (24) from NBS Monograph 65, "Reduction of Data for Piston Gage Pressure Measurements."

Values listed are "True Mass."

Certificate Of Calibration

MIDWEST GAGE LAB
299 BOND ST.
ELK GROVE VILLAGE, IL. 60007
(847)439-9220

INSPECTION REPORT

DATE: 07/09/96 S.O. No. 1490930

CUSTOMER: Precision Surveillance Corp. P.O. No. 665

DESCRIPTION: 0-1" Surveillance Kit, S/N 654

REQUIRED	ACTUAL
.140	.14007
.243	.24305
.346	.34610
.449	.44909
.552	.55210
.655	.65506
.758	.75808
.861	.86109
.964	.96408

INSPECTOR: Jeffrey Hallmann

SIGNED [signature]

NIST TRACEABILITY NO. 821/254855-95
NIST DATE: 09/20/95

Measurements made in accordance with MIL-STD 45662A. The size standards used in measuring were calibrated traceable to the National Institute of Standards and Technology, Washington, D.C.

Calibration Certificate

MIDWEST GAGE LAB
299 BOND ST.
ELK GROVE VILLAGE, IL. 60007
(708)439-9220

INSPECTION REPORT

DATE: 06/08/95 S.O. NO. 1229308

CUSTOMER: Precision Surveillance P.O. NO. 649

DESCRIPTION: 24" Master Ruler, S/N MR-1

1/64"	REQUIRED	ACTUAL	.020"	REQUIRED	ACTUAL
	1/2"	.500		.500	.500
	6"	6.000		5.000	5.000
	12 3/8"	12.375		10.000	10.000
	16 1/8"	16.125		15.600	15.600
	20 1/64"	20.016		20.050	20.050
	24"	24.000		24.000	24.000
1/32"			.100"		
	1/2"	.500		.100	.100
	6"	6.000		5.900	5.900
	12 5/8"	12.625		9.500	9.500
	16 1/32"	16.032		12.000	12.000
	20 7/8"	20.875		16.300	16.300
	24"	24.000		24.000	24.000

INSPECTOR: Jeffrey Hallmann
SIGNED [signature]

NIST TRACEABILITY NO. 821/252017-93
NIST DATE: 08/12/94

Measurements made in accordance with MIL-STD 45662A. The size standards used in measuring were calibrated traceable to the National Institute of Standards and Technology, Washington, D.C.

Calibration Certificate

MIDWEST GAGE LAB
299 BOND ST.
ELK GROVE VILLAGE, IL. 60007
(708)439-9220

INSPECTION REPORT

DATE: 06/08/95 S.O. NO. 1229308

CUSTOMER: Precision Surveillance P.O. NO. 649

DESCRIPTION: 1.6" Glass Reticle Scale, GRCS-1

REQUIRED (INTERVAL)	* ACTUAL (LENGTH)
.000 TO .002	.0020
.000 TO .004	.0040
.000 TO .006	.0060
.000 TO .008	.0080
.000 TO .010	.0100
.000 TO .012	.0120
.000 TO .014	.0140
.000 TO .016	.0160
.000 TO .018	.0180
.000 TO .020	.0200

* Accuracy +/-.00005

INSPECTOR: Jeffrey Hallmann
SIGNED [signature]

NIST TRACEABILITY NO. 821/252017-93
NIST DATE: 08/12/94
Measurements made in accordance with MIL-STD 45662A.
The size standards used in measuring were calibrated traceable to the National Institute of Standards and Technology, Washington, D.C.

Calibration Certificate

MIDWEST GAGE LAB
299 BOND ST.
ELK GROVE VILLAGE, IL. 60007
(708)439-9220

INSPECTION REPORT

DATE: 06/08/95 S.O. NO. 1229308

CUSTOMER: Precision Surveillance P.O. NO. 649

DESCRIPTION: 1.6" Glass Reticle Scale, GRCS-1

REQUIRED (INTERVAL)	* ACTUAL (LENGTH)
.000 TO .100	.1000
.000 TO .200	.2000
.000 TO .300	.3000
.000 TO .400	.4000
.000 TO .500	.5000
.000 TO .600	.6000
.000 TO .700	.6999
.000 TO .800	.7999
.000 TO .900	.8998
.000 TO 1.000	.9998
.000 TO 1.100	1.0998
.000 TO 1.200	1.1998
.000 TO 1.300	1.2997
.000 TO 1.400	1.3997
.000 TO 1.500	1.4996
.000 TO 1.600	1.5995

* Accuracy +/-.00005

INSPECTOR: Jeffrey Hallmann
SIGNED [signature]

NIST TRACEABILITY NO. 821/252017-93
NIST DATE: 08/12/94
Measurements made in accordance with MIL-STD 45662A.
The size standards used in measuring were calibrated traceable to the National Institute of Standards and Technology, Washington, D.C.

US DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
CHEMICAL SCIENCE AND TECHNOLOGY LABORATORY
GAITHERSBURG, MD 20899

REPORT OF CALIBRATION

LIQUID-IN-GLASS THERMOMETER

Tested for: Percision Surveillance Corporation
Marked: PRINCO S/N 00995 — #63F
Range: +18 to +89 °F in 0.2 °F

Thermometer Reading	Correction (ITS-90)**
32.17	-0.17
60.00	-0.40
88.00	+0.25

**All temperatures in this report are on the International Temperature Scale of 1990 (ITS-90). This temperature scale was adopted by the International Committee of Weights and Measures at its meeting in September 1989, and is described in "The International Temperature Scale of 1990", Metrologia 27, No. 1, 3-10 (1990); Metrologia 27, 107 (1990).

In the above corrections, the estimated Type B Standard Uncertainty is 0.02 °F; and for the ice point, 0.002 °F. For a discussion of the uncertainty, see NIST TN 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," by B. N. Taylor and C. E. Kuyatt, and NIST TN 1411 "Reproducibility of the Temperature of the Ice Point in Routine Measurements," by B. W. Mangum. Sufficient data needed to calculate the Type A Standard Uncertainty are not available at this time and the overall "Estimated" Uncertainty, as published in SP 250-23 (originally published in Bureau of Standards Circular No. 8, August 11, 1921), of 0.2 °C up to 110.0 °C, will be used.

For a discussion of accuracies attainable with such thermometers, see NIST Internal Report 5341, "Assessment of Uncertainties of Liquid-In-Glass Thermometer Calibrations at the National Institute of Standards and Technology". For the procedure used to calibrate them, see National Institute of Standards and Technology SP 250-23, Liquid-In-Glass Thermometer Calibration Service.

If no sign is given on the correction, the true temperature is higher than the indicated temperature; if the sign given is negative, the true temperature is lower than the indicated temperature. To use the corrections properly, reference should be made to the notes given below.

Test Number: 257242
P.O. Number: 666
Completed: September 3, 1996

US DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
CHEMICAL SCIENCE AND TECHNOLOGY LABORATORY
GAITHERSBURG, MD 20899

REPORT OF CALIBRATION

LIQUID-IN-GLASS THERMOMETER

Tested for: Percision Surveillance Corporation
Marked: PRINCO S/N 03324 – #64F
Range: +77 to +131 °F in 0.2 °F
Auxiliary scale at 32 °F

Thermometer Reading	Correction (ITS-90)**
31.93	+0.07
80.00	0.02
130.00	-0.05

**All temperatures in this report are on the International Temperature Scale of 1990 (ITS-90). This temperature scale was adopted by the International Committee of Weights and Measures at its meeting in September 1989, and is described in "The International Temperature Scale of 1990", Metrologia 27, No. 1, 3-10 (1990); Metrologia 27, 107 (1990).

In the above corrections, the estimated Type B Standard Uncertainty is 0.02 °F; and for the ice point, 0.002 °F. For a discussion of the uncertainty, see NIST TN 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," by B. N. Taylor and C. E. Kuyatt, and NIST TN 1411 "Reproducibility of the Temperature of the Ice Point in Routine Measurements," by B. W. Mangum. Sufficient data needed to calculate the Type A Standard Uncertainty are not available at this time and the overall "Estimated" Uncertainty, as published in SP 250-23 (originally published in Bureau of Standards Circular No. 8, August 11, 1921), of 0.2 °C up to 110.0 °C, will be used.

For a discussion of accuracies attainable with such thermometers, see NIST Internal Report 5341, "Assessment of Uncertainties of Liquid-In-Glass Thermometer Calibrations at the National Institute of Standards and Technology". For the procedure used to calibrate them, see National Institute of Standards and Technology SP 250-23, Liquid-In-Glass Thermometer Calibration Service.

If no sign is given on the correction, the true temperature is higher than the indicated temperature; if the sign given is negative, the true temperature is lower than the indicated temperature. To use the corrections properly, reference should be made to the notes given below.

Test Number: 257242
P.O. Number: 666
Completed: September 3, 1996

US DEPARTMENT OF COMMERCE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
CHEMICAL SCIENCE AND TECHNOLOGY LABORATORY
GAITHERSBURG, MD 20899

REPORT OF CALIBRATION

LIQUID-IN-GLASS THERMOMETER

Tested for: Percision Surveillance Corporation
Marked: USA S/N 1980931 ~# 65F
Range: +122 to +176 °F in 0.2 °F
Auxiliary scale at 32 °F

Thermometer Reading	Correction (ITS-90)**
32.29	-0.29
125.00	-0.10
175.00	-0.10

**All temperatures in this report are on the International Temperature Scale of 1990 (ITS-90). This temperature scale was adopted by the International Committee of Weights and Measures at its meeting in September 1989, and is described in "The International Temperature Scale of 1990", Metrologia 27, No. 1, 3-10 (1990); Metrologia 27, 107 (1990).

In the above corrections, the estimated Type B Standard Uncertainty is 0.02 °F; and for the ice point, 0.002 °F. For a discussion of the uncertainty, see NIST TN 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," by B. N. Taylor and C. E. Kuyatt, and NIST TN 1411 "Reproducibility of the Temperature of the Ice Point in Routine Measurements," by B. W. Mangum. Sufficient data needed to calculate the Type A Standard Uncertainty are not available at this time and the overall "Estimated" Uncertainty, as published in SP 250-23 (originally published in Bureau of Standards Circular No. 8, August 11, 1921), of 0.2 °C up to 110.0 °C, will be used.

For a discussion of accuracies attainable with such thermometers, see NIST Internal Report 5341, "Assessment of Uncertainties of Liquid-In-Glass Thermometer Calibrations at the National Institute of Standards and Technology". For the procedure used to calibrate them, see National Institute of Standards and Technology SP 250-23, Liquid-In-Glass Thermometer Calibration Service.

If no sign is given on the correction, the true temperature is higher than the indicated temperature; if the sign given is negative, the true temperature is lower than the indicated temperature. To use the corrections properly, reference should be made to the notes given below.

Test Number: 257242
P.O. Number: 666
Completed: September 3, 1996

The thermometer was tested in a large, closed-top, electrically heated liquid bath at total immersion. The temperature of the room was about 23 °C (73 °F). If the thermometer is used under conditions which would cause the average temperature of the emergent liquid column to differ markedly from that prevailing in the test, appreciable differences in the indications of the thermometer would result.

For the Director
National Institute of Standards and Technology

B. W. Mangum

Dr. B. W. Mangum
Leader, Thermometry Group
Process Measurements Division

Test Number: 257242
P.O. Number: 666
Completed: September 3, 1996

FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
TENDON SURVEILLANCE PROGRAM
ENGINEERING EVALUATION
of the
SIXTH TENDON SURVEILLANCE

Performed By: Matthew F. Denny

Reviewed By: John D. Shubert, Jr.

Approved By: John J. Curham

INDEX

FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
TENDON SURVEILLANCE PROGRAM
ENGINEERING REPORT

1.0 INTRODUCTION

The sixth tendon surveillance for the Crystal River Unit 3 (CR-3) Reactor Building post tensioning system was performed between October 20, 1997 and January 16, 1998. The surveillance was performed to demonstrate the integrity of the containment prestressing system, including containment tendons, tendon end anchorage hardware, general and adjacent concrete integrity, and corrosion protection system. The tendon surveillance was performed in accordance with the CR-3 Improved Technical Specifications (ITS). This surveillance occurred during the twenty-second year after the CR-3 structural integrity test, which took place in November, 1976. The tendon surveillance was completed while the plant was shut down.

The inspection activities at CR-3 were performed by Precision Surveillance Corporation (PSC). Florida Power Corporation (FPC) controlled and monitored all activities. The PSC Report, 20th Year Physical Surveillance At Crystal River Nuclear Plant (Reference 1), presents the results of the inspection activities performed during the surveillance period.

The inspection was performed in accordance with FPC Surveillance Procedure SP-182 Revision 13, Reactor Building Structural Integrity Tendon Surveillance Program (Reference 2). Laboratory test results of material samples (tendon wires and bulk filler grease) are included in the PSC Report.

The purpose of this report is to summarize the results of the tendon surveillance, with respect to the requirements of the CR-3 Tendon Surveillance Program. Nonconformances identified during the surveillance are summarized in the PSC Report. Results found to be outside of the acceptance criteria, and not previously accepted, were evaluated and dispositioned by FPC, and are discussed in their respective sections within this report.

All work performed for this surveillance was evaluated based on the acceptance criteria as presented in Regulatory Guide 1.35, Revision 3 (Reference 3), issued July 1990, and incorporated into SP-182. The specific instructions are contained in PSC Inservice Inspection Manual N604 (contained in Section 9.0 of the PSC Report).

The references listed in section 10.0 of this report are available for review upon request.

2.0 TENDON SELECTION

Sixteen tendons were scheduled for inspection during the sixth surveillance. This population included the eight deferred tendons exempted during the fifth surveillance. The selection process involved the consideration of the following criteria:

A. Tendons were selected to be random but representative of the entire tendon population. Samples were selected to represent the areas of containment that were not previously surveyed and that were accessible.

B. Representative samples were selected to represent the respective groupings of tendons, including D100 series, D200 series, etc.

C. Control tendons previously selected.

D. Except for the control tendons, tendons were selected which were not previously tested.

E. Documentation was researched and inquiries made of FPC personnel to determine if there were any leaking or problem tendons which should be included in the scope of this surveillance. No specific tendons were identified.

F. Tendon historical data sheets were reviewed and the number of effective wires reviewed and considered. A tendon with the minimal number of effective wires was not selected for detensioning or as a control tendon.

G. The reduced force dome tendons are not in the selected population since their prestress forces are significantly less than all other tendons.

H. Accessibility for the surveillance equipment was considered in walkdowns.

The initial tendons selected for the sixth tendon surveillance were:

DOME	HOOP	VERTICAL
D113	42H18	12V1 C
D115	42H32	23V2
D212 C	42H44	61V21 D
D304 D	51H26 C	61V10 A
D311	53H2	
D131 A	53H46	
	62H41 D	
	62H46	
	62H22 A	

C = Control Tendon
D = Detensioned Tendon
A = Alternated Tendon

FPC inspected eleven additional hoop tendons due to the low prestress forces in some of the initial hoop tendons selected. These tendons were:

42H29	42H36
42H30	42H37
42H31	51H25
42H33	51H27
42H34	51H28
42H35	

The end-caps of two tendons were also removed to investigate deformations. The removal of the end-caps did not reveal any abnormal conditions. The tendons were then restored (i.e. gaskets replaced and regreased). These tendons are:

51H41 (Field End; Buttress 5)
43V4 (Shop End; Top)

Predicted tendon prestress force curves were prepared for all of the selected tendons, an alternate tendon from each tendon group, and for adjacent tendons on each side of the selected tendons. The force curves for the additional eleven hoop tendons were generated and included into FPC Calculation Package S95-0082 (Reference 4).

3.0 TENDON PHYSICAL INSPECTION

3.1 Anchorage Assembly Inspection

Tendon anchorage assembly components, including stressing washers (anchorheads), buttonheads, bearing plates, and shims were all inspected during the surveillance. The PSC report summarizes the results of the inspection for corrosion at each of the tendon ends.

The tendon anchorage assembly components did not exhibit unacceptable levels of corrosion.

3.2 Physical Condition Tests

Sample wires were removed from the three tendons, D304, 62H41, and 61V21, selected for detensioning. In addition to these scheduled wire tests, one random wire was removed from tendons 51H26 and 42H35. A broken wire was also removed and tested from tendon 51H26. All samples tested were found to be acceptable.

Tendon wires, and specifically ineffective tendon wires, are tabulated in Appendix A, and were evaluated in accordance with the acceptance criteria, as defined in SP-182, Enclosure 9.

The results of the tendon wire inspections provide additional assurance that the tendon wires are performing their intended function and that no local problem areas exist in the tendon post tensioning system.

4.0 TENDON ELONGATION

Information on tendon elongation was taken for all detensioned tendons during the retensioning process. The tendon elongation measured during the surveillance was compared to the measured elongation at original installation. The difference in percentage of elongation was compared to the acceptance criteria. A difference exceeding plus or minus ten percent was required to be investigated to determine if the difference is related to wire failure or wire slipping at anchorage.

Measured elongation values from this surveillance are presented in the PSC report for each tendon. One tendon did not meet the acceptance criteria. Tendon 51H26 had a negative 11.6 % variance in elongation when the surveillance results were compared to the original measured elongation. The negative value indicates that less elongation was measured in the current surveillances than at the original stressing. This condition was observed in prior surveillances for other tendons as well. FPC concluded that the condition was not indicative of wire failure and slippage. The elongation differences obtained in this surveillance are also not considered to be an indication of wire failure and slippage.

Tendon 51H26 had two wires removed for inspection and testing. Tensile and yield strength tests were performed on the wire samples. These wires were visually inspected and found to be in good condition and the test results demonstrated that all wires met the guaranteed minimum ultimate tensile and yield strengths for the material.

The less than expected tendon elongation is not the result of wire failure or slippage. Therefore, there was no adverse or detrimental effect on the integrity of the post tensioning system.

5.0 INDIVIDUAL TENDONS LIFT OFF FORCE EVALUATION

This tendon surveillance is based on the requirements of Regulatory Guide 1.35, Revision 3, as described in SP-182. Previous surveillance data incorporated parts of Regulatory Guide 1.35, Revision 3 for information only. Such data is used where appropriate in this evaluation.

The Normalizing Factor used in the surveillance is defined as the effect of the original installation sequence of stressing. This value varies from plus to minus, depending on the tendons position in the stressing sequence.

A lift-off is performed on each surveillance tendon to monitor the force exerted by the tendon onto the structure. Measured lift-off forces are the average of both ends, except for the vertical tendons where lift-off is measured from the top only. Lift-off forces for all 27 tendons in this surveillance are presented in Table VII of the PSC Report.

Vertical tendon lift-offs were found to be above the Base Value except for 12V1, which was above 95% of the Base Value. All dome lift-off averages were above the Base Value.

Horizontal lift-offs revealed two isolated areas 42H30 to 42H36 inclusive and 51H26 and 51H27 where average tendon lift-offs were between 90% and 95% of Base Value. Two tendons 51H26 and 42H35 were found to be below 90% of base and were detensioned for continuity tests. These continuity tests revealed that all of the wires were continuous, one wire was removed for testing and the tendons restored to base value -0%, +6%. All other tendons found between 90% and 95% of Base Value were subsequently restored per SP-182 to the Base Value.

All other tendon lift-offs were either above Base Value or 95% of Base Value and therefore, acceptable.

5.1 EVALUATION OF TENDON 51H26

The lift-off force of 1320 Kips fell below the 90% Base Value of 1362 Kips. This was determined to be unacceptable and was reported to the NRC in FPC Special Report 97-07. The tendon was also identified as having one broken wire.

The tendon was detensioned, the broken wire removed and one other wire removed for testing to determine if wire failure contributed to the lower than predicted tendon force. The tendon was retensioned to 6% above the Base Value of 1513 Kips, with allowance being made for the loss of the two wires.

Tendon 51H26 had lift-off tests performed in the third and fourth Surveillances. The results of those tests were in both cases about 92.5% of the Base Value at the time of the test. There were no broken wires identified. The results are plotted on the attached Figure 1.

As seen in Figure 1, the predicted value lines are parallel to the historical trend line plotted for the third and fourth tendon surveillance. Extending this historical trend line to the sixth tendon surveillance yields a value of 1390 Kips. Correcting for the one broken wire yields a predicted value of 1381 Kips. The actual lift-off of 1320 Kips is 4.5% below the historical predicted value of 1381 Kips.

The Normalizing Factor for 51H26 is -75 Kips. When the actual lift-off of 1320 Kips is normalized, the resulting normalized lift-off force is 1245 Kips. This was 7 Kips (0.6%) below the required minimum tendon force of 1252 Kips.

5.5.1 CONCLUSION FOR TENDON 51H26

The two adjacent tendons, 51H25 and 51H27, were subsequently tested for lift-off. The results obtained were 97% and 93% of their respective Base Value.

Because tendon 51H27 had a lift-off force below 95% of Base Value, a lift-off test was performed on the adjacent tendon, 51H28. The lift-off force obtained for this adjacent tendon was 96% of the Base Value.

The average normalized tendon lift-off force for tendons 51H25, 51H26, 51H27, and 51H28 is 1378 Kips. This was 126 Kips (10.1%) above the required minimum tendon force of 1252 Kips for hoop tendons. Subsequent to the lift-off testing the four tendons were retensioned and locked-off at 6% above their respective Base Value.

The lower than predicted lift-off force for tendon 51H26 is acceptable. This is based on past surveillance results for the tendon, small deviation from the historical predicted force, and the fact that the group of tendons comprising 51H26 and adjacent tendons 51H25, 51H27, and 51H28 have an average normalized tendon lift-off force which exceeds the required minimum tendon force. Further, there is no indication of degradation within the tendon components.

Tendon 51H26 was designated as a Control Tendon. Because the tendon was detensioned and had wires removed, it is no longer available to be a Control Tendon. Consideration has been given to the selection of 46H21 as a new Control Tendon. It has been tested in the first and fifth tendon surveillances.

5.2 EVALUATION OF TENDON 42H32

Tendon 42H32 had a lift-off force of 1356 Kips, 93% of Base Value, which falls below the 95% Base Value. Therefore, the two adjacent tendons had lift-off tests performed. The lift-off force for each of these two tendons fell below the 95% Base Value. This was determined to be unacceptable and was reported to the NRC in FPC Special Report 97-07.

To investigate the cause of this anomaly, further lift-off testing was performed on additional adjacent tendons. The lift-off testing continued with additional adjacent tendons until the lift-off force of the tendon was greater than the 95% Base Value.

Tendon	Lift-off as % of Base Value	Normalized Lift-off (KIPS)
42H29	100	1441
42H30	95	1357
42H31	92	1317
42H32	93	1341
42H33	92	1326
42H34	95	1364
42H35	89	1280
42H36	94	1343
42H37	97	1387

Subsequent to the lift-off testing, the nine tendons were retensioned and locked-off at 6% above their respective Base Value. Allowance was made for the one removed wire in 42H35, discussed below

The lift-off force of tendon 42H35, at 89% of Base Value, fell below the 90% Base Value. To determine if wire failure was the cause, the tendon was detensioned and one wire was removed for testing.

5.2.1 Possible Causes of Low Hoop Tendon Forces

Dome and Vertical Tendon Trend of Tendon Forces

During the past five surveillances the dome and vertical tendon forces as measured by lift-off testing have been in good agreement with the Base Value. This would suggest that the cause of the lower than predicted hoop tendon forces is unique to the hoop tendons.

Elevated Temperature

Localized hot spots and temperature variations along the length of a tendon can cause variations in the force along the length of the tendon. The stress relaxation properties of prestressing steel and the basic concrete creep vary with temperature variations.

Elevated temperature considerations up to 104 degrees Fahrenheit (F) for the tendon wire were taken into account for CR-3. This would indicate that the resulting stress relaxation would not be as severe as those designs using 68 degree F wire. The center of the hoop tendons was approximately nine inches from the outside face of the concrete and approximately two to three inches from the inside face of the containment liner, making the potential effects of higher interior temperatures less significant (Reference CR-3 FSAR, Figure 5-11, "Reactor Building Iso-Thermal Curves for Winter Operating Temperature Condition").

The CR-3 tendon wire is a stabilized, low relaxation wire (Reference CR-3 Enhanced Design Basis Document, Containment System, page 6 & 7, and Specification SP-5583). The stabilized wires were cold-worked to yield in order to limit the overall relaxation.

The effects of elevated temperature are not perceived as a major cause of the CR-3 lower hoop prestress condition.

Wire Relaxation

In addition to the above noted discussion on the type of wire, it is noted that a true wire relaxation problem would likely have an equal effect on all three tendon groups. Since this is not occurring, the effects of increased wire relaxation is not seen as the sole contributor of the lower hoop prestress condition.

Concrete Creep

One of the most significant and variable factors in the computation of time-dependent losses in prestressed concrete containment structures is the influence of concrete creep, (Reference Regulatory Guide 1.35.1, Section 2.2.2 for further discussion).

The predicted concrete creep loses for the hoop tendons may be effected by the softer coarse aggregate, (Gilbert Commonwealth (G/C) Report, "Reactor Building Dome Delamination, Final Report", December 10, 1976). The stresses in the hoop direction are higher than the stresses in the vertical direction (1732 psi vs. 967 psi). This may explain some of the differences seen between the dome, vertical, and hoop lift-off force results as compared to their Base Values.

Further studies would be required to determine if the softer coarse aggregate used in the CR-3 concrete may have contributed to the lower hoop prestress condition. These studies will not be performed at this time due to the trend showing adequate prestress for the 40 year plant life.

Equipment and Data Accuracy

The calibration of the measuring equipment was checked daily with no abnormal conditions noted. The major equipment was calibrated prior to the surveillance and after the surveillance. Equipment and data accuracy is not considered as a contributing cause to the low lift-off force values.

Voids/Delamination in Concrete

The possibility of voids and/or delamination of the concrete cylinder were investigated.

At the time of the dome delamination in 1976, the question was raised and investigated regarding delamination of the concrete cylinder. The conclusion, based on field investigations and engineering studies, was that there was no delamination of the concrete cylinder.

A loss of tendon force of 150 Kips could be caused by a change of tendon length of about 0.5 inches. Delamination and resulting movement of the containment liner would result in bulges, ripples, possibly flaked containment coating, and other visible defects. The radial movement would be about 0.5 to 1.0 inches if it occurred between two buttresses. On December 9, 1997 observations of the containment liner in the area of these nine tendons were conducted. There were no visible defects noted during this tour.

A delamination in the concrete could become a receptacle for grease from the tendon ducts. Past surveillances have had vertical tendons with upward of 40 gallons of grease added over that which was removed. (Reference past surveillance reports, including G/C "Engineering Evaluation Report for the Fifth Tendon Surveillance Inspection Period", June 20, 1994). There were no instances of excessive grease replacement for any tendons during this surveillance.

There is no evidence to suggest that voids and/or delamination of the concrete cylinder exist or have contributed to the lower than predicted hoop lift-off forces.

Calculated Prestress Levels

Possible conservatism in the design basis calculations for the determination of the three prestress forces, (i.e. Dome = 1215 Kips, Vertical = 1149 Kips, and Hoop = 1252 Kips) has been previously investigated. FPC concluded there was no excess conservatism included in those calculations. Thus, it is not likely the minimum design prestress requirement of 1252 Kips for the hoop tendons would be lowered.

Required Minimum Tendon Force

Lift-off testing was performed on 19 horizontal tendons during the sixth surveillance.

The average normalized tendon lift-off force for the horizontal tendons is 1399 Kips. This is 147 Kips (11.7%) above the required minimum tendon force of 1252 Kips for hoop tendons.

Figure 2 shows the plot of the regression line representing the trend of losses for the tested hoop tendons. The data point for this tendon surveillance, 1399 Kips, has good correlation with the first through fifth trend line. Projecting the first through fifth trend line to the sixth tendon surveillance would predict an average force of about 1395, indicating less than 1% difference in the predicted and actual.

Further, the projected trend line at the end of the 40 year plant life is above the required prestress level of 1252 Kips.

Tendon 42H32 and the two adjacent tendons, 42H31 and 42H33, had an average normalized lift-off force of 1328 Kips. This normalized lift-off force exceeds the required minimum tendon force of 1252 Kips by 76 Kips (6.0%).

In this group of nine tendons, the tendon with the lowest lift-off force was 42H35. Tendon 42H35 and the two adjacent tendons, 42H34 and 42H36, have an average normalized lift-off force of 1329 Kips. This normalized lift-off force exceeds the required minimum tendon force of 1252 Kips by 77 Kips (6.0%).

The normalized lift-off force for tendons 42H31 through 42H36 was calculated in groups of three (i.e. 42H31 to 42H33 and 42H34 to 42H36). The results were an average normalized lift-off forces of 1328 Kips and 1329 Kips respectively. These results were plotted on Figure 2. Considering the close correlation of the data point for the 19 tested hoop tendons, a parallel trend line has been constructed on Figure 2 from the normalized lift-off forces of 1328 Kips and 1329 Kips. The projected trend line at the end of the 40 year plant life is above the required prestress level of 1252 Kips.

Variance in Tendon End Lift-off Values

The lift-off forces of tendons 42H29 through 42H37 were calculated by averaging the lift-off force of the two ends, shop end at Buttress 4 and the field end at Buttress 2. In all cases the field end lift-off force was lower than the shop end. The difference varied from 62 Kips to 276 Kips. A review of the original stressing records show that in general the field end was locked-off at a lower level than the shop end. The maximum difference was about 50 Kips. However, three of the tendons had the shop end locked-off at a lower level than the field end. Tendon 42H35 with lift-off less than 90% of Base Value was detensioned and a "push-pull" test was performed. The results of this test did not offer any in-sight into the difference in end lift-off force values. Further actions included the removal of a wire for testing, which had no abnormalities found.

As previously noted, there is no evidence to suggest that voids and/or delamination of the concrete cylinder exist or have contributed to the difference in the shop/field end lift-off forces.

There is no apparent reason for the difference in the lift-off forces of the shop and field end. As previously noted, the force in a hoop tendon is based on the average of the two ends. The averages used for this surveillance were not adjusted due to the variance in force found for the shop and field ends.

5.2.2 CONCLUSION FOR TENDON 42H32

The lower than predicted lift-off force for tendon 42H30 through 42H36 is acceptable based on:

- Tendon 42H32 and the two adjacent tendons having an average normalized lift-off force exceeding the required minimum tendon force of 1252 Kips.
- Tendon 42H35 and the two adjacent tendons having an average normalized lift-off force exceeding the required minimum tendon force of 1252 Kips.
- 42H32 and 42H35 and their adjacent tendons have a projected trend line at the end of the 40 year plant life above the required prestress level of 1252 Kips.
- There is no indication of degradation within the tendon components.

5.3 SUMMARY OF LIFT-OFF TESTING

The results of the surveillance with regard to the hoop tendon prestress has demonstrated that the CR-3 containment has been maintained at a level sufficient to maintain containment integrity throughout the plants life.

The lower than predicted lift-off force for tendon 51H26 is acceptable. This is based on past surveillance results for the tendon, small deviation from the historical predicted force, no indications of distress, and the fact that the group of tendons comprising 51H26 and adjacent tendons 51H25, 51H27, and 51H28 have an average normalized tendon lift-off force which exceeds the required minimum average tendon force.

Tendon 51H26 is no longer available to be a Control Tendon. Consideration has been given to the selection of 46H21 as a Control Tendon.

Tendon 42H32 and the adjacent tendons are acceptable. This is based on no indications of distress, and the acceptable normalized prestress forces.

There is no indication of failure of tendon elements from corrosion or material deficiency. The present tendon system appears to have sufficient prestress for the 40 year plant life. Plant life extension would require a review of the tendon system, possibly retensioning of tendons, and adequate planning.

6.0 HISTORICAL TRENDS

A comparison of the lift-off forces from this surveillance to the original installation lock-off forces was made in an effort to detect any evidence of system degradation. The lock-off forces were compared in order to detect any abnormal force loss which would possibly indicate an underestimation of the creep, shrinkage and/or elastic shortening effects in the Reactor Building.

Three tendons were excluded from the results due to inconsistencies. Tendons 23V2 and 53H2 both reported higher lift-offs during the sixth containment tendon surveillance than at installation. Both of the original reported lift-offs appear to be lower than the group average at installation, the horizontal by almost 5%, which could indicate an error in recording the original result. Tendon D304 lost only 12 Kips from the original recorded lift-off. In no case were any conditions found that would indicate problems with the wire conditions or forces found. These results are not considered detrimental to the structure. Due to these results being inconsistent with the rest of the results, they have been omitted from the group averages. The group averages have been plotted with previous surveillance results and are included in Appendix B.

7.0 TENDON RELATED CONCRETE INSPECTION

As part of the surveillance, visual inspections were performed to evaluate the condition of the concrete immediately adjacent to each tendon area. In addition, a general inspection was performed to evaluate the concrete condition of the exterior of the Reactor Building. These inspections were performed as required by the SP-182. Results are documented in the PSC Report in Section 4 on data sheets SQ8.3 and SQ8.4.

SP-182 requires that concrete cracks greater than 0.010 inches in width be evaluated. Cracks in excess of 0.050 inches shall be investigated for cause and effect on the structural integrity of the Reactor Building. During this surveillance, two tendons had concrete gaps greater than the 0.050 inch acceptance criteria. These tendons areas are D311 and 51H26. Cracks were evaluated and accepted as shrinkage or surface cracks and were found to have no impact on the ability of the structure to perform its design function. The gap found around tendon 51H26 was determined to be due to the spalling of cosmetic concrete. The cosmetic concrete was removed by design change, MAR 95-09-02-01 (Reference 10). The gaps (small cracks with pieces missing) found on tendon D311 were evaluated as having no detrimental effect on the Reactor Building. The evaluation and determination of corrective actions is continuing per Precursor Card (PC) 97-8303.

The results of the general exterior inspection found concrete spalling 31 feet from the top of the dome. The previous patching was found breaking apart. This condition was addressed per PC 97-7986 and found to be cosmetic. Repair plans were developed and an implementation plan is being formulated.

Exterior walls were all found to be in good condition. There was evidence of leaking grease plugs on tendons 62H43, 62H33, 62H23 and a slight gasket leak on tendon 53H40. The slight grease leaks have been determined to be minor leaks and will be corrected during the next surveillance.

Based on the results of the tendon adjacent area concrete inspections and the general exterior Reactor Building inspection, no significant problems were found which would affect the integrity of the post tensioning system of the Reactor Building.

8.0 CORROSION PROTECTION SYSTEM INSPECTION

Visual examinations of the grease were performed with results of each tendon presented in the PSC Report, Appendix B and summarized in Table 2. There were no adverse findings. It was noted that the P-4 grease is lighter in color and thicker than the older P-2 grease. This difference was taken into account in the acceptance criteria for visual grease inspection.

Samples of bulk filler grease were removed from each end of the tendons and sent for laboratory testing. Tests were performed for the following conditions:

	Acceptance Criteria
Chlorides	10ppm maximum
Nitrates	10ppm maximum
Sulfides	10ppm maximum
Moisture content	10% Maximum
Reserve Alkalinity (Base, Neutralization No.)	Greater than 50% of the installed value, or greater than 0 when the installed value was less than 5.

All samples met the acceptance criteria, as stated above, with the exception of tendon 51H25 field end which had a water content result of 14.9%. This condition was reported to the NRC in FPC Special Report 98-01. Since there was limited amount of grease available for testing in the grease cans, due to the large shim volume, there was not sufficient grease available for additional samples. This result was not necessarily indicative of the tendon grease condition throughout the tendon. Inspection of the tendon end anchorage, shims, and buttonheads showed no abnormal corrosion which would indicate a moisture problem. The gasket was replaced and the anchorage refilled with new grease.

Grease replacement quantities for individual tendons were monitored, as required by SP-182. The specified acceptance criteria was that the absolute difference between the amount of grease removed and the amount of grease replaced on a given tendon shall not exceed 5% of the net duct volume. The replaced grease data has been tabulated in Table XII of the PSC Report. Five tendons (D212, D304, D311, 42H30, and 42H34) exceeded the acceptance criteria. This condition was reported to the NRC in FPC Special Report 97-09. A review of prior surveillance reports indicates that CR-3 has not been able to meet this acceptance criteria in the past. This exceedance has typically been in the range of 10 to 23 gallons (~9% to ~20 %) over that removed. FPC has previously evaluated this condition for past surveillances and the evaluation is still applicable at this time. This evaluation can be found in the G/C report, dated June 20, 1994, Attachment D.

Inspections performed this outage of the Reactor Building have not identified any tendon grease leakage problems. The inspection of bottom end caps of all vertical tendons as required by the current revision of the regulatory guide, was performed with no leaks found. In addition, an observation of the interior surface of the Reactor Building was conducted with no abnormal conditions (bulging, bowing, etc.) found. The overall condition of the tendon wires remains good and successful wire tests performed for all six surveillances support the conclusion that the corrosion protection system is performing well and maintaining the integrity of the tendons.

9.0 SIXTH TENDON SURVEILLANCE CONCLUSION

The results of the surveillance have demonstrated that the structural integrity of the CR-3 Reactor Building has been adequately maintained to ensure its operability through the life of the plant.

Conclusions based upon the various inspections and tests performed during this surveillance are summarized below.

Group Tendon Forces

The average prestress condition for each of the three groups of tendons is currently projected to exceed the required minimum levels at the end of the expected 40 year plant life. The projected trend of prestress forces for each of the three tendon groups shows adequate margin available at the projected end of the 40 year plant life.

Anchorage and Assembly Hardware

Tendon anchorage hardware was inspected and found to be in good condition. There were instances of corrosion that were found, such as on bearing plates outside of the O-Ring end-cap seal. These corrosion instances are typical of that expected for a plant in service almost twenty years and did not exceed the acceptance criteria contained in SP-182.

Wires

Tendon wires were found to be in good condition. No corrosion was found on the tendon wires removed from the detensioned tendons. Material tests on the tendon wires showed that all wires met the minimum guaranteed ultimate tensile strength.

Corrosion Protection System

Based on the visual inspections performed during the surveillance and the results of sample testing of the bulk filler material, it can be concluded that the corrosion protection system is performing its protective function with no abnormal degradation.

Concrete

A few minor cracks and spalls found during the inspection were typical for a facility of this age. No concrete problems were observed that impacted the design function or integrity of the Reactor Building.

10.0 REFERENCES

(1) Precision Surveillance Corporation Report, 20th Year Physical Surveillance of the Crystal River Nuclear Plant Containment Post Tensioning System, Revision 0, 4/1/98. (Volumes I, IA and II).

(2) Surveillance Procedure, SP-182 Revision 13, FPC CR-3, Reactor Building Structural Integrity Tendon Surveillance Program.

(3) U.S. Regulatory Guide 1.35, Revision 3, July 1990, Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containments.

(4) FPC Calculation Package, S95-0082, Preparation of Tendon Force Curves for 6th Tendon Surveillance.

(5) CR-3 Enhanced Design Basis Document (EDBD), Containment System.

(6) G/C Specification SP-5583.

(7) U.S. Regulatory Guide 1.35.1, Revision 0, July 1990, Determining Prestressing Forces for Inservice Inspection of Prestressed Concrete Containments.

(8) G/C Report, Reactor Building Dome Delamination, Final Report, 12-10-76.

(9) G/C Report, Engineering Evaluation Report for the Fifth Tendon Surveillance Inspection Period, 6-20-94.

(10) Modification Package, MAR 95-09-02-01, Revision 0, Repair R.B. Concrete Buttresses.

(11) CR-3 FSAR, Revision 24.01.

(12) FPC Special Reports 97-07, 97-09, and 98-01.

FIGURES

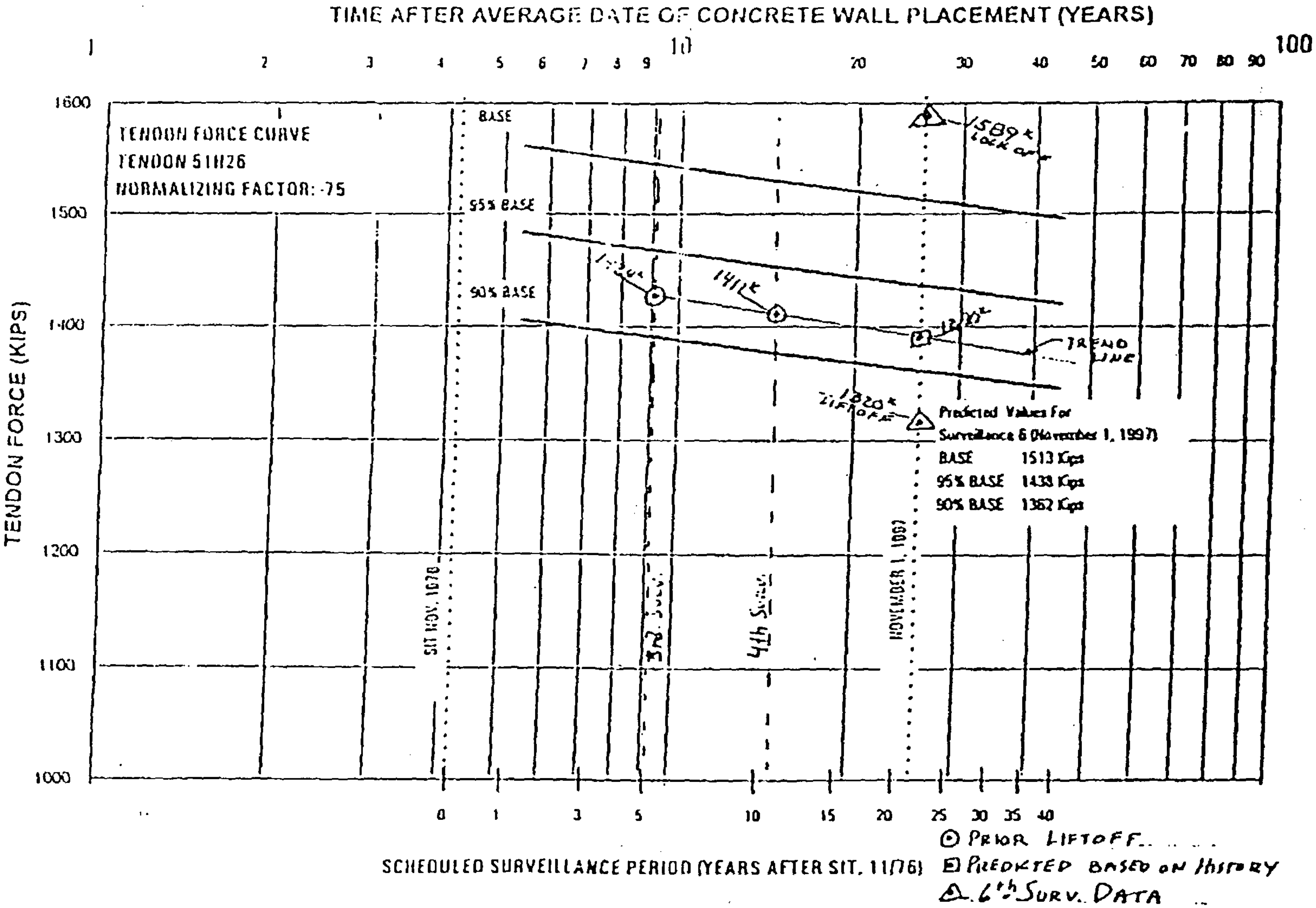

FIGURE 1
TENDON 51H26 LIFT-OFF

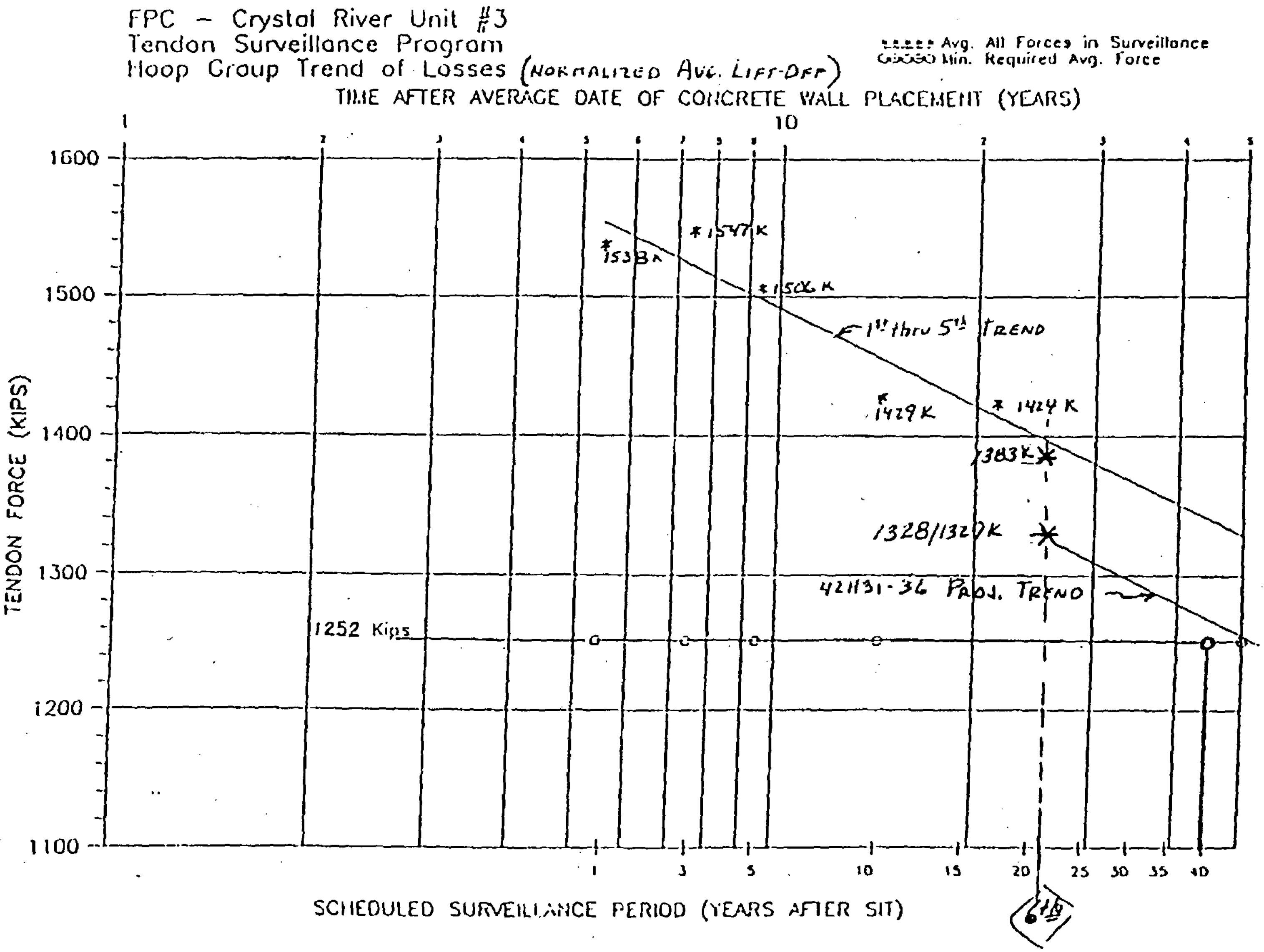

FIGURE 2
HOOP TENDON TREND OF LOSSES

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APPENDIX A
TENDON WIRE SUMMARIES
DOME, HOOP AND VERTICAL GROUPS

INEFFECTIVE WIRE SUMMARY
UPDATED TO SIXTH SURVEILLANCE

Acceptance Criteria

1. Maximum of 8 ineffective wires per tendon.

2. Maximum of 3% ineffective wires per 10 consecutive tendons.

3. Maximum of 2% ineffective wires per group.

The vertical tendons group consists of one stressing sequence quadrant of 36 tendons. The dome tendons group consists of one series layer of 41 tendons, i.e. D100, D200 and D300 groups. The hoop tendons group consists of one side of a buttress or 47 tendons.

The results of all tabulated data are summarized as follows:

Tendon Group	Max/Tendon	Max/10 Tendons	Max/Group
Domes			
Actual	7 (Note 1)	30	67
Allowable	8	49	134
Verticals			
Actual	6	21	38
Allowable	8	49	117
Hoops			
Actual	6	18	49
Allowable	8	49	153

Notes

1. Dome tendons D-217 and D-233 with 16 and 12 ineffective wires respectively exceed the 8 wire maximum per tendon, but were previously accepted for that condition. These two tendons are reduced force dome tendons and it was determined that the high number of ineffective wires was due to unseating as a result of the reduced tensioning force in the tendons.

2. The calculation for the ten consecutive tendons for the last nine tendons was performed by using the data from first tendons at the top of the listing.

3. Maximum wires per group are noted on the tendon group sheets.

FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
DOME TENDON WIRE SUMMARY
UPDATED TO 6th SURVEILLANCE

D100 GROUP					
			***	Total	***
Tendon No.	Eff. Wires	Ineff. Wires	if greater than 8	Ineff. wires in next 10 Tendons	if greater than 49 (3%)
D 101 **	162	1		9	
D 102	163	0		8	
D 103	163	0		8	
D 104	157	6		8	
D 105	162	1		3	
D 106	162	1		2	
D 107	163	0		2	
D 108	163	0		2	
D 109 **	163	0		2	
D 110	163	0		2	
D 111	163	0		2	
D 112	163	0		3	
D 113	163	0		3	
D 114	162	1		4	
D 115	163	0		3	
D 116	162	1		3	
D 117 **	163	0		2	
D 118	163	0		2	
D 119	163	0		6	
D 120	163	0		8	
D 121	162	1		8	
D 122	163	0		9	
D 123	162	1		10	
D 124	163	0		12	
D 125 **	163	0		13	
D 126	163	0		14	
D 127	163	0		15	
D 128	159	4		22	
D 129	161	2		19	
D 130	163	0		17	
D 131	161	2		17	
D 132	162	1		15	
D 133 **	160	3		15	
D 134	162	1		12	
D 135	162	1		11	
D 136	162	1		16	
D 137	156	7		16	
D 138	162	1		10	
D 139	163	0		9	
D 140	163	0		9	
D 141 **	163	0		9	
TOTAL	6647	36	OK		
MAXIMUM 2%/GROUP		134			

D 200 GROUP					
			***	Total	***
Tendon No.	Eff. Wires	Ineff. Wires	if greater than 8	Ineff. wires in next 10 Tendons	if greater than 49 (3%)
D 201 **	163	0		10	
D 202	162	1		11	
D 203	163	0		11	
D 204	161	2		11	
D 205	160	3		11	
D 206	163	0		8	
D 207	161	2		8	
D 208	161	2		22	
D 209 **	163	0		25	
D 210	163	0		25	
D 211	162	1		27	
D 212	162	1		27	
D 213	163	0		26	
D 214	161	2		26	
D 215	163	0		26	
D 216	163	0		30	
D 217 **	147	16	***	30	
D 218	158	5		14	
D 219	163	0		9	
D 220	161	2		9	
D 221	162	1		7	
D 222	163	0		10	
D 223	163	0		10	
D 224	161	2		22	
D 225 **	159	4		21	
D 226	163	0		18	
D 227	163	0		19	
D 228	163	0		19	
D 229	163	0		19	
D 230	163	0		19	
D 231	159	4		19	
D 232	163	0		19	
D 233 **	151	12	***	19	
D 234	162	1		8	
D 235	162	1		7	
D 236	162	1		8	
D 237	163	0		10	
D 238	163	0		10	
D 239	163	0		12	
D 240	163	0		14	
D 241 **	159	4		14	
TOTAL	6616	67	OK		
MAXIMUM 2%/GROUP		134			

D 300 Group					
			***	Total	***
Tendon No.	Eff. Wires	Ineff. Wires	if greater than 8	Ineff. wires in next 10 Tendons	if greater than 49 (3%)
D 301 **	162	1		21	
D 302	156	7		23	
D 303	161	2		16	
D 304	161	2		14	
D 305	160	3		14	
D 306	161	2		12	
D 307	163	0		10	
D 308	160	3		10	
D 309 **	163	0		9	
D 310	162	1		9	
D 311*	160	3		11	
D 312	163	0		8	
D 313	163	0		10	
D 314	161	2		12	
D 315	162	1		10	
D 316	163	0		10	
D 317 **	163	0		10	
D 318	161	2		10	
D 319	163	0		8	
D 320	160	3		9	
D 321	163	0		7	
D 322	161	2		9	
D 323	161	2		9	
D 324	163	0		10	
D 325 **	162	1		11	
D 326	163	0		14	
D 327	163	0		14	
D 328	163	0		14	
D 329	162	1		15	
D 330	162	1		17	
D 331	161	2		16	
D 332	161	2		16	
D 333 **	160	3		15	
D 334	162	1		19	
D 335	159	4		20	
D 336	163	0		18	
D 337	163	0		21	
D 338	162	1		23	
D 339	160	3		22	
D 340	163	0		22	
D 341 **	161	2		22	
TOTAL	6626	57	OK		
MAXIMUM 2%/GROUP		134			

** REDUCED FORCE TENDONS
MAXIMUM WIRES PER GROUP = 41 x 163 = 6683

* - D311 had 3 malformed buttonheads.

FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
HOOP TENDONS WIRE SUMMARY
UPTDATED TO 6th SURVEILLANCE

13HXX GROUP					
Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wires in next 10 Tendons	*** if greater than 49 (3%)
13H 01	161	2		4	
13H 02	163	0		2	
13H 03	163	0		2	
13H 04	163	0		2	
13H 05	163	0		2	
13H 06	163	0		2	
13H 07	163	0		4	
13H 08	163	0		4	
13H 09	161	2		7	
13H 10	163	0		7	
13H 11	163	0		8	
13H 12	163	0		13	
13H 13	163	0		13	
13H 14	163	0		13	
13H 15	163	0		13	
13H 16	161	2		13	
13H 17	163	0		11	
13H 18	160	3		11	
13H 19	161	2		8	
13H 20	162	1		8	
13H 21	158	5		7	
13H 22	163	0		2	
13H 23	163	0		3	
13H 24	163	0		4	
13H 25	163	0		4	
13H 26	163	0		6	
13H 27	163	0		9	
13H 28	163	0		10	
13H 29	161	2		11	
13H 30	163	0		10	
13H 31	163	0		11	
13H 32	162	1		11	
13H 33	162	1		10	
13H 34	163	0		10	
13H 35	161	2		10	
13H 36	160	3		9	
13H 37	162	1		6	
13H 38	162	1		5	
13H 39	162	1		6	
13H 40	162	1		5	
13H 41	163	0		4	
13H 42	163	0		4	
13H 43	162	1		4	
13H 44	163	0		3	
13H 45	162	1		3	
13H 46	163	0		2	
13H 47	163	0		4	
TOTAL	7629	32	OK		
MAXIMUM 2%/GROUP		153			

35HXX GROUP					
Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wires in next 10 Tendons	*** if greater than 49 (3%)
35H 01	161	2		14	
35H 02	162	1		18	
35H 03	161	2		17	
35H 04	161	2		17	
35H 05	160	3		15	
35H 06	163	0		12	
35H 07	162	1		12	
35H 08	161	2		11	
35H 09	163	0		9	
35H 10	162	1		10	
35H 11	157	6		9	
35H 12	163	0		4	
35H 13	161	2		4	
35H 14	163	0		2	
35H 15	163	0		3	
35H 16	163	0		4	
35H 17	163	0		4	
35H 18	163	0		4	
35H 19	162	1		4	
35H 20	163	0		7	
35H 21	162	1		7	
35H 22	163	0		6	
35H 23	163	0		6	
35H 24	162	1		6	
35H 25	162	1		5	
35H 26	163	0		4	
35H 27	163	0		4	
35H 28	163	0		4	
35H 29	159	4		4	
35H 30	163	0		5	
35H 31	163	0		5	
35H 32	163	0		5	
35H 33	163	0		5	
35H 34	163	0		6	
35H 35	163	0		6	
35H 36	163	0		6	
35H 37	163	0		6	
35H 38	163	0		6	
35H 39	158	5		8	
35H 40	163	0		4	
35H 41	163	0		6	
35H 42	163	0		8	
35H 43	162	1		11	
35H 44	163	0		10	
35H 45	163	0		11	
35H 46	163	0		13	
35H 47	163	0		13	
TOTAL	7625	36	OK		
MAXIMUM 2%/GROUP		153			

51HXX Group					
Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wires in next 10 Tendons	*** if greater than 49 (3%)
51H 01	163	0		11	
51H 02	163	0		11	
51H03	163	0		11	
51H 04	162	1		15	
51H 05	163	0		14	
51H 06	161	2		14	
51H 07	162	1		13	
51H 08	160	3		12	
51H 09	161	2		11	
51H 10	161	2		9	
51H 11	163	0		7	
51H 12	163	0		7	
51H 13	159	4		7	
51H 14	163	0		3	
51H 15	163	0		3	
51H 16	162	1		4	
51H 17	163	0		5	
51H 18	161	2		9	
51H 19	163	0		7	
51H 20	163	0		7	
51H 21	163	0		8	
51H 22	163	0		11	
51H 23	163	0		12	
51H 24	163	0		12	
51H 25*	162	1		12	
51H 26	161	2		11	
51H 27*	159	4		10	
51H 28	163	0		8	
51H 29	163	0		9	
51H 30	162	1		9	
51H 31	160	3		8	
51H 32	162	1		5	
51H 33	163	0		5	
51H 34	163	0		7	
51H 35	163	0		8	
51H 36	162	1		9	
51H 37	161	2		8	
51H 38	162	1		7	
51H 39	163	0		6	
51H 40	163	0		6	
51H 41	163	0		6	
51H 42	162	1		7	
51H 43	161	2		6	
51H 44	162	1		6	
51H 45	162	1		6	
51H 46	163	0		8	
51H 47	162	1		10	
TOTAL	7621	40	OK		
MAXIMUM 2%/GROUP		153			

MAXIMUM WIRES PER GROUP = 47 X 163 = 7661

* - 51H25 had 162 effective wires recorded on original data sheet (bad wire)
* - 51H27 had 161 effective wires recorded on original data sheet (bad wire)

FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
HOOP TENDONS WIRE SUMMARY
UPTDATED TO 6th SURVEILLANCE

42HXX GROUP

Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wires in next 10 Tendons	*** If greater than 49 (3%)
42H 01	160	3		8	
42h 02	160	3		5	
42H 03	163	0		2	
42H 04	162	1		3	
42H 05	163	0		3	
42H 06	163	0		3	
42H 07	162	1		3	
42H 08	163	0		2	
42H 09	163	0		2	
42H 10	163	0		2	
42H 11	163	0		2	
42H 12	163	0		3	
42H 13	162	1		4	
42H 14	162	1		4	
42H 15	163	0		3	
42H 16	163	0		3	
42H 17	163	0		3	
42H 18	163	0		3	
42H 19	163	0		3	
42H 20	163	0		3	
42H 21	162	1		3	
42H 22	162	1		2	
42H 23	162	1		1	
42H 24	163	0		0	
42H 25	163	0		3	
42H 26	163	0		5	
42H 27	163	0		5	
42H 28	163	0		5	
42H 29	163	0		5	
42H 30	163	0		5	
42H 31	163	0		6	
42H 32	163	0		7	
42H 33	163	0		7	
42H 34*	160	3		7	
42H 35	161	2		4	
42H 36	163	0		2	
42H 37	163	0		2	
42H 38	163	0		5	
42H 39	163	0		8	
42H 40	162	1		11	
42H 41	162	1		10	
42H 42	163	0		10	
42H 43	163	0		10	
42H 44	163	0		10	
42H 45	163	0		11	
42H 46	163	0		11	
42H 47	160	3		11	
TOTAL	7638	23	OK		
MAXIMUM 2%/GROUP		153			

46HXX GROUP

Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wires in next 10 Tendons	*** If greater than 49 (3%)
46H 01	163	0		7	
46H 02	163	0		10	
46H 03	163	0		10	
46H 04	163	0		12	
46H 05	159	4		12	
46H 06	163	0		10	
46H 07	163	0		10	
46H 08	162	1		12	
46H 09	162	1		13	
46H 10	162	1		12	
46H 11	160	3		14	
46H 12	163	0		12	
46H 13	161	2		13	
46H 14	163	0		14	
46H 15	161	2		14	
46H 16	163	0		15	
46H 17	161	2		15	
46H 18	161	2		13	
46H 19	163	0		11	
46H 20	160	3		15	
46H 21	162	1		14	
46H 22	162	1		13	
46H 23	160	3		12	
46H 24	163	0		9	
46H 25	160	3		9	
46H 26	163	0		6	
46H 27	163	0		6	
46H 28	163	0		8	
46H 29	159	4		9	
46H 30	161	2		6	
46H 31	163	0		8	
46H 32	163	0		8	
46H 33	163	0		8	
46H 34	163	0		8	
46H 35	163	0		8	
46H 36	163	0		12	
46H 37	161	2		12	
46H 38	162	1		12	
46H 39	162	1		11	
46H 40	159	4		10	
46H 41	163	0		6	
46H 42	163	0		6	
46H 43	163	0		10	
46H 44	163	0		10	
46H 45	159	4		10	
46H 46	163	0		7	
46H 47	161	2		8	
TOTAL	7612	49	OK		
MAXIMUM 2%/GROUP		153			

62HXX Group

Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wires in next 10 Tendons	*** If greater than 49 (3%)
62H 01	162	1		11	
62H 02	163	0		12	
62H 03	163	0		12	
62H 04	161	2		12	
62H 05	159	4		10	
62H 06	163	0		6	
62H 07	162	1		6	
62H 08	161	2		5	
62H 09	163	0		3	
62H 10	162	1		5	
62H 11	161	2		5	
62H 12	163	0		4	
62H 13	163	0		4	
62H 14	163	0		4	
62H 15	163	0		4	
62H 16	163	0		6	
62H 17	163	0		6	
62H 18	163	0		6	
62H 19	161	2		6	
62H 20	162	1		5	
62H 21	162	1		4	
62H 22	163	0		3	
62H 23	163	0		3	
62H 24	163	0		4	
62H 25	161	2		5	
62H 26	163	0		4	
62H 27	163	0		4	
62H 28	163	0		5	
62H 29	162	1		5	
62H 30	163	0		5	
62H 31	163	0		5	
62H 32	163	0		8	
62H 33	162	1		8	
62H 34	162	1		9	
62H 35	162	1		8	
62H 36	163	0		8	
62H 37	162	1		8	
62H 38	163	0		10	
62H 39	162	1		11	
62H 40	163	0		10	
62H 41	160	3		10	
62H 42	163	0		9	
62H 43	161	2		13	
62H 44	163	0		11	
62H 45	162	1		12	
62H 46	163	0		13	
62H 47	160	3		13	
TOTAL	7627	34	OK		
MAXIMUM 2%/GROUP		153			

MAXIMUM WIRES PER GROUP = 47 X 163 = 7661

* - 42H34 had 160 effective wires recorded on original data sheet (bad wire)

FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
VERTICAL TENDONS WIRE SUMMARY
UPTDATED TO 6th SURVEILLANCE

QUADRANT 1 (30 Deg. TO 120 Deg.)						QUADRANT 2 (300 Deg. TO 30 Deg.)					
Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wire in next 10 Tendons	*** if greater than 49 (3%)	Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wire in next 10 Tendons	*** if greater than 49 (3%)
23V 01	163	0		0		12V 13	162	1		16	
23V 02	163	0		0		12V 14	163	0		18	
23V 03	163	0		0		12V 15	159	4		19	
23V 04	163	0		0		12V 16	163	0		17	
23V 05	163	0		0		12V 17	160	3		21	
23V 06	163	0		4		12V 18	163	0		18	
23V 07	163	0		4		12V 19	160	3		18	
23V 08	163	0		5		12V 20	163	0		18	
23V 09	163	0		6		12V 21	160	3		18	
23V 10	163	0		6		12V 22	161	2		15	
23V 11	163	0		8		12V 23	160	3		13	
23V 12	163	0		8		12V 24	162	1		10	
23V 13	163	0		8		61V 01	161	2		9	
23V 14	163	0		8		61V 02	159	4		10	
23V 15	159	4		8		61V 03	163	0		6	
23V 16	163	0		5		61V 04	163	0		6	
23V 17	162	1		5		61V 05	160	3		7	
23V 18	162	1		4		61V 06	163	0		7	
23V 19	163	0		4		61V 07	163	0		7	
23V 20	161	2		4		61V 08	163	0		8	
23V 21	163	0		4		61V 09	163	0		8	
23V 22	163	0		5		61V 10	163	0		8	
23V 23	163	0		5		61V 11	160	3		8	
23V 24	163	0		5		61V 12	163	0		6	
12V 01	162	1		5		61V 13	163	0		6	
12V 02	163	0		7		61V 14	162	1		6	
12V 03	163	0		7		61V 15	160	3		5	
12V 04	162	1		7		61V 16	163	0		3	
12V 05	163	0		6		61V 17	162	1		3	
12V 06	161	2		6		61V 18	163	0		6	
12V 07	162	1		4		61V 19	163	0		6	
12V 08	163	0		3		61V 20	163	0		9	
12V 09	163	0		3		61V 21	162	1		9	
12V 10	163	0		3		61V 22	163	0		11	
12V 11	160	3		3		61V 23	163	0		11	
12V 12	163	0		0		61V 24	163	0		14	
TOTAL	5852	16	OK			TOTAL	5830	38	OK		
MAXIMUM 2%/GROUP		117				MAXIMUM 2%/GROUP		117			

MAXIMUM WIRES PER GROUP = 36 X 163 = 5868

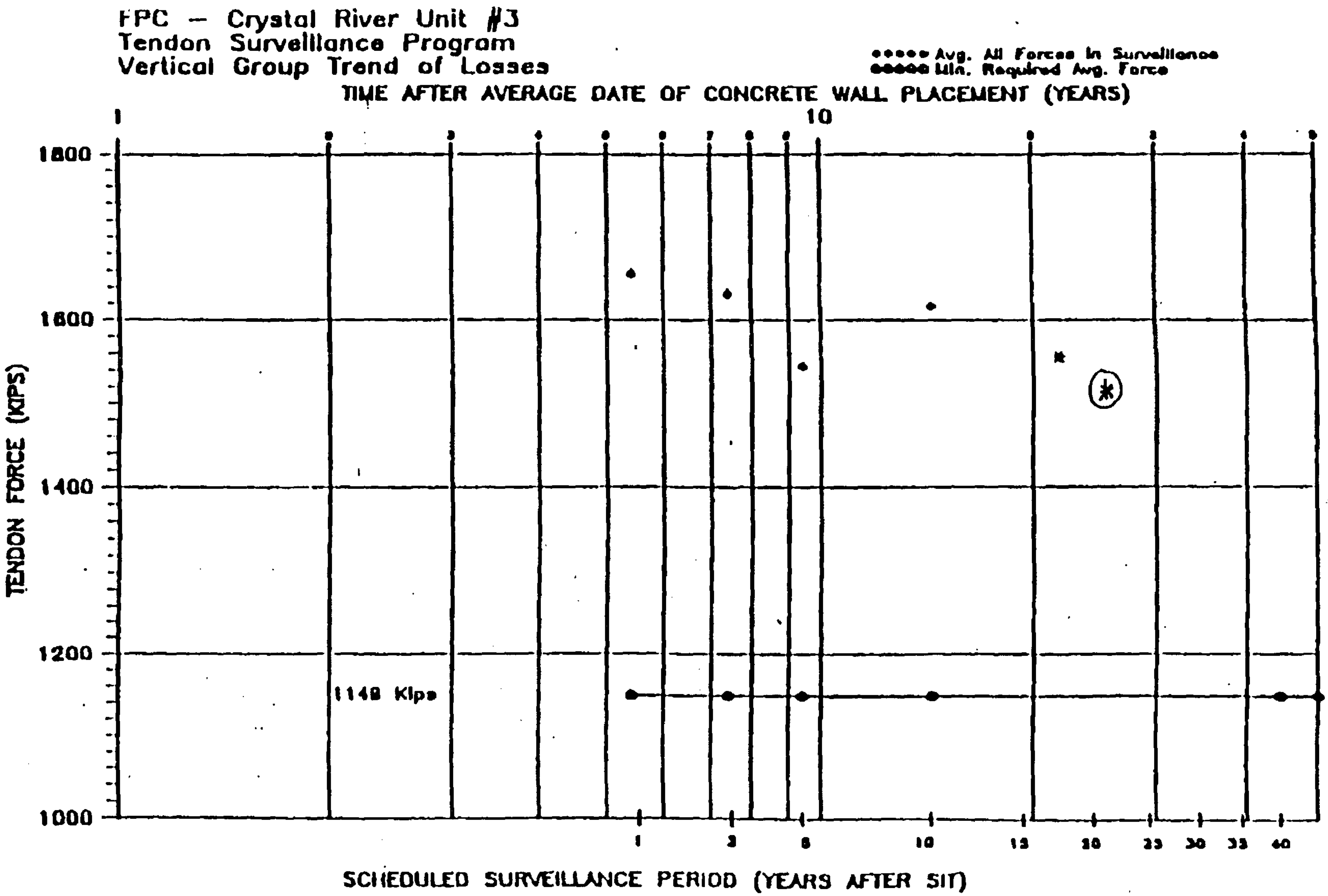
FLORIDA POWER CORPORATION
CRYSTAL RIVER UNIT 3
VERTICAL TENDONS WIRE SUMMARY
UPTDATED TO 6th SURVEILLANCE

QUADRANT 3 (210 Deg. TO 300 Deg.)						QUADRANT 4 (120 Deg. TO 210 Deg.)					
Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wire in next 10 Tendons	*** if greater than 49 (3%)	Tendon No.	Eff. Wires	Ineff. Wires	*** if greater than 8	Total Ineff. wire in next 10 Tendons	*** if greater than 49 (3%)
56V 01	162	1		10		45V 13	163	0		4	
56V 02	162	1		9		45V 14	163	0		4	
56V 03	163	0		8		45V 15	163	0		5	
56V 04	162	1		9		45V 16	163	0		5	
56V 05	162	1		8		45V 17	163	0		6	
56V 06	162	1		10		45V 18	163	0		9	
56V 07	161	2		11		45V 19	163	0		12	
56V 08	161	2		9		45V 20	161	2		12	
56V 09	162	1		7		45V 21	162	1		10	
56V 10	163	0		9		45V 22	162	1		9	
56V 11	163	0		9		45V 23	163	0		10	
56V 12	163	0		11		45V 24	162	1		10	
56V 13	162	1		13		34V 01	163	0		9	
56V 14	163	0		12		34V 02	162	1		9	
56V 15	160	3		12		34V 03	160	3		9	
56V 16	161	2		11		**34V 04**	**160**	**3**		**10**	
56V 17	163	0		9		34V 05	163	0		8	
56V 18	163	0		10		34V 06	163	0		9	
56V 19	160	3		11		34V 07	163	0		11	
56V 20	163	0		8		34V 08	161	2		11	
56V 21	161	2		9		34V 09	163	0		9	
56V 22	161	2		13		34V 10	163	0		13	
56V 23	163	0		11		34V 11	163	0		13	
56V 24	163	0		11		34V 12	162	1		14	
45V 01	161	2		13		34V 13	159	4		13	
45V 02	163	0		11		34V 14	162	1		9	
45V 03	162	1		11		34V 15	162	1		9	
45V 04	162	1		11		34V 16	161	2		8	
45V 05	163	0		11		34V 17	163	0		6	
45V 06	162	1		11		34V 18	163	0		6	
45V 07	157	6		11		34V 19	159	4		6	
45V 08	163	0		6		34V 20	163	0		2	
45V 09	163	0		7		34V 21	162	1		2	
45V 10	161	2		9		34V 22	163	0		1	
45V 11	163	0		9		34V 23	163	0		3	
45V 12	163	0		10		34V 24	162	1		4	
TOTAL	5832	36	OK			TOTAL	5839	29	OK		
MAXIMUM 2%/GROUP		117				MAXIMUM 2%/GROUP		117			

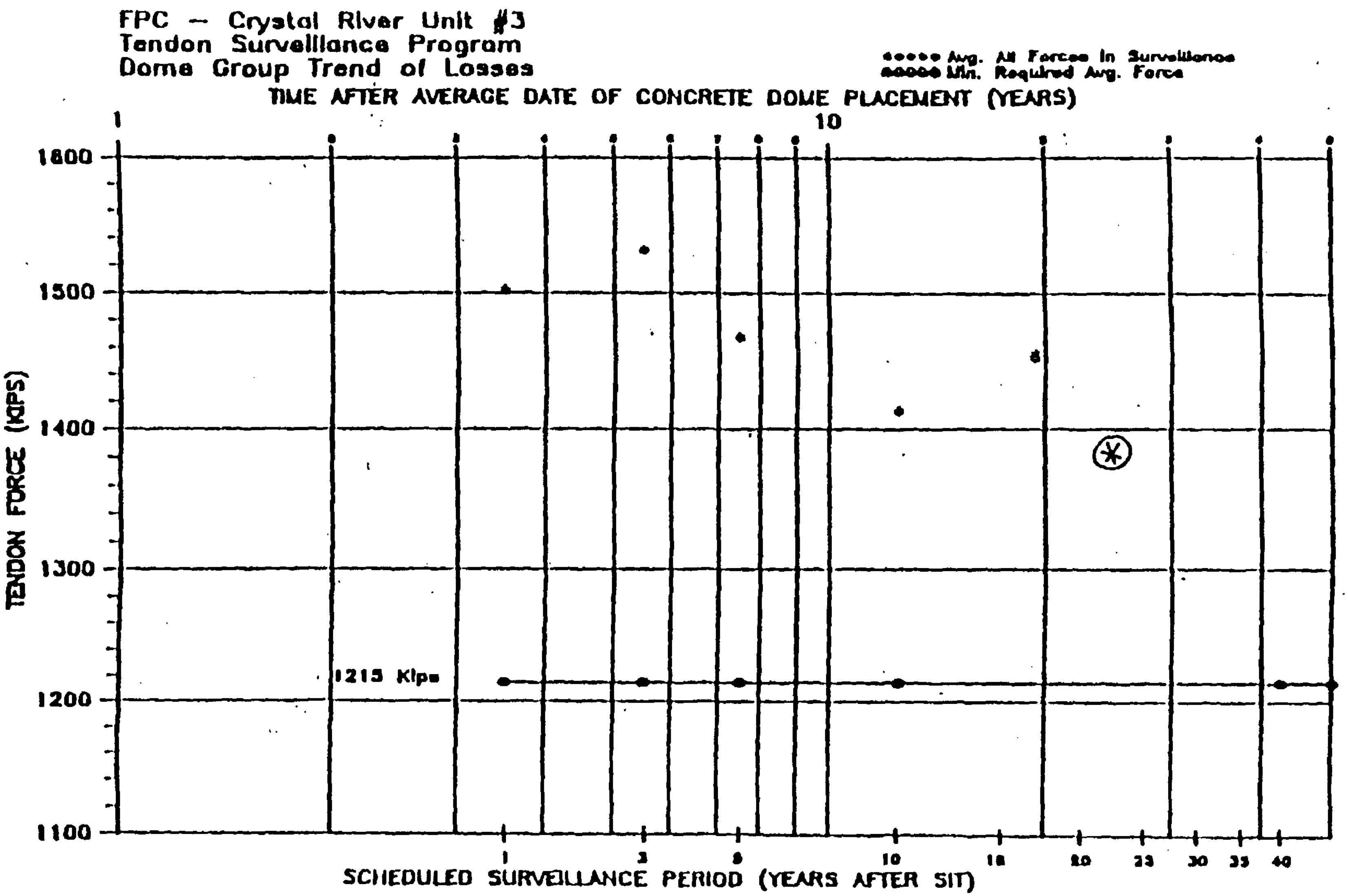
MAXIMUM WIRES PER GROUP = 36 X 163 = 5868

APPENDIX B
TENDON TREND OF LOSSES

TENDON HISTORICAL TRENDS
VERTICAL TENDONS



TENDON HISTORICAL TRENDS
DOME TENDONS



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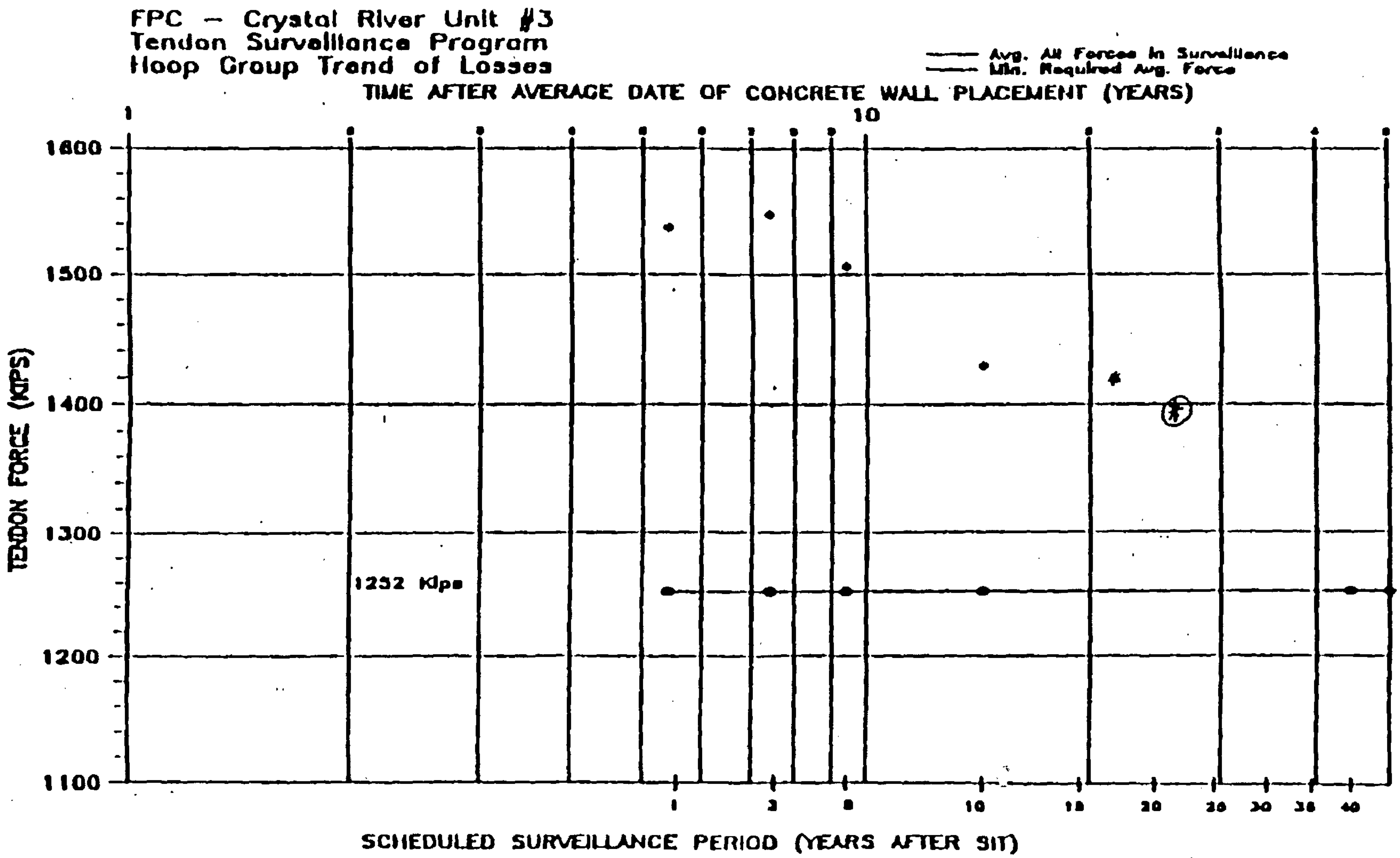
TENDON HISTORICAL TRENDS
HOOP TENDONS



Rev. 13

Effective Date 10/18/97

SURVEILLANCE PROCEDURE

SP-182

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

REACTOR BUILDING STRUCTURAL INTEGRITY
TENDON SURVEILLANCE PROGRAM

APPROVED BY: Interpretation Contact

J Curham for J R MASEDA
(SIGNATURE ON FILE)

DATE: 10/17/97

INTERPRETATION CONTACT: Manager, Nuclear Plant
Technical Support

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ENCLOSURES

NOTE: These Enclosures are included for reference by the Surveillance Contractors Inspection Manual discussed in Section 4.0, Instructions.

1.0 PURPOSE

The purpose of the Tendon Surveillance Program is to demonstrate the integrity of the containment prestressing system, including containment tendons, tendon end anchorage hardware, general and adjacent concrete integrity, and evaluation of the corrosion protective (grease) system. Individual inspections of selected tendons, as well as tendon wire and grease sample testing, are to be performed to the requirements of this procedure, to evaluate the overall integrity of the prestressing system.

2.0 REFERENCES

2.1 IMPLEMENTING REFERENCES

2.1.1 Code and Standard References

2.1.1.1 ASTM A421-65, Standard Specification for Uncoated Stress Relieved Wire for Prestressed Concrete

2.1.1.2 ACI 201.1R-68, Revised 1984, Guide for Making a Condition Survey of Concrete Inservice

2.1.1.3 ASTM D512, Standard Test Methods for Chloride Ion in Water

2.1.1.4 ASTM D992, Standard Test Methods for Nitrite-Nitrate in Water

2.1.1.5 APHA 427, Standard Methods for Examination of Water and Waste Water

2.1.1.6 ASTM D95, Standard Test Method for Water in Petroleum Products and Bituminous Materials by Distillation

2.1.1.7 ASTM D974 (Modified), Standard Test Method for Acid and Base Number by Color-Indicator Titration

2.1.2 Drawing References

2.1.2.1 Prescon Corporation - Tendons Drawings (series)

2.1.2.2 Swan Manufacturing Company - Conduit Drawings (series)

2.1.2.3 Reactor Building - Concrete Drawings (series)

2.1.3 Compliance Procedure References

2.1.3.1 Compliance Procedure, CP-111, Processing of Precursor Cards for Corrective Action Program

2.1.3.2 Compliance Procedure, CP-121, Review and Control of Contractor Procedure or Instruction

2.1.3.3 Compliance Procedure, CP-146, Measuring and Test Equipment Calibration and Control

2.1.3.4 Compliance Procedure, CP-150, Identifying and Processing Operability Concerns

2.1.3.5 Compliance Procedure, CP-151, External Reporting Requirements

2.1.4 Administrative Instruction References

2.1.4.1 Administration Instruction, AI-400E, Performance and Transmittal of Procedures

2.1.4.2 Administration Instruction, AI-500, Conduct of Operations - Operations Department Organization and Administration

2.1.4.3 Administration Instruction, AI-1811, Safety at Heights

2.1.4.4 Administration Instruction, AI-1803, Safety Standard for Ladders, Scaffolds, and Ancillary Equipment

2.1.4.5 Administration Instruction, AI-607, Pre-Job and Post-Job Briefings

2.1.5 Other References

2.1.5.1 Florida Power Corporation (FPC) Accident Prevention Manual

2.1.5.2 Surveillance Contractor operating manuals and calibration charts for hydraulic stressing jack, pumps, and controls. These manuals shall be Plant Review Committee (PRC) approved, prior to use.

2.1.5.3 Dome, Vertical and Hoop Tendon History Sheets

2.1.5.4 Precision Surveillance Corporation, Inservice Inspection Manual N604 for Florida Power Corporation - Crystal River Unit 3 Nuclear Station. This manual shall be PRC approved, prior to use.

2.2 DEVELOPMENTAL REFERENCES

2.2.1 Technical Specification References

Applicable References	Surveillance Performance During Modes	LCO/Other Requirements During Modes
3.6.1	1 through 6	1, 2, 3, 4
SR 3.6.1.2	1 through 6	N/A
SR 3.0.2	N/A	N/A
SR 3.0.3	N/A	N/A
5.6.2.7	1 through 6	N/A
5.7.2	N/A	N/A

Frequency Notes:

Tendon surveillance was required at 1, 3, and 5 years after the Initial Containment Structural Integrity Test (SIT), and shall be performed every 5 years thereafter for the life of the plant. The 1, 3, and 5 year inspections shall commence not more than 6 months prior to the specified dates and shall be completed not more than 6 months after such dates. The 10 year and subsequent examinations shall commence not more than 1 year prior to the specified dates and shall be completed not more than 1 year after such dates.

2.2.2 Regulatory and Code Document References

2.2.2.1 U.S. Regulatory Guide 1.35, Revision 3, July 1990, Inservice Inspection of Ungrouted Tendons in Prestressed Concrete Containments

2.2.2.2 Section XI of the ASME Boiler and Pressure Vessel Code, Subsection IWL, Requirements for Class CC Concrete Components of Light-Water Cooled Plants, 1992 Addenda of the 1992 Edition as amended by 10CFR50.55a, Codes and Standards

2.2.3 Administrative Instruction References

2.2.3.1 Administrative Instructions, AI-400C, New Procedures and Procedure Change Process

2.2.3.2 Administrative Instructions, AI-402B, Procedure Writing (Except for Abnormal and Emergency Operating Procedures)

2.2.4 Design Analysis/Calculation References

2.2.4.1 Calculation S-95-0082, Preparation of Tendon Force Curves for 6th Tendon Surveillance

2.2.4.2 Calculation S-80-0002, Required Minimum Average Tendon Forces

2.2.5 Other References

2.2.5.1 SP-182, Reactor Building Structural Integrity Tendon Surveillance Program, Revision 12, and past surveillance results

3.0 PERSONNEL INDOCTRINATION

3.1 SETPOINTS

None

3.2 DESCRIPTION

The Containment Tendon Surveillance Program defined in this SP-182, including inspection frequencies, and acceptance criteria, complies with Regulatory Guide 1.35, Revision 3, July 1990 and is enhanced by additional requirements from the 1992 addenda of the 1992 Edition of ASME Section XI, Subsection IWL and the applicable amendments as specified in 10CFR50.55a, Codes and Standards.

The Tendon Surveillance Program is usually conducted during an outage. However, it may be conducted periodically during plant operation. For a surveillance during plant operation, special precautions must be taken to avoid work in hazardous areas resulting from plant operating conditions. This includes the steam vent zone outside and between buttresses 1 and 3, and areas inside the plant where radiological or other safety hazards must be considered. Also, any potential impact or effects on safety related systems and equipment in the immediate vicinity of the surveillance activity must be considered.

For surveillance periods during plant outages, the effects of heavy load drops must be considered for all surveillance work performed over the fuel pool area during the period when fuel pool missile shields have been removed for fuel transfer.

3.2.1 Tendon Selection

Eleven tendons shall be selected for each surveillance period consisting of 5 hoop tendons, 3 vertical tendons, and 3 dome tendons. The 6th surveillance will inspect 16 tendons to include the deferred tendons exempted during the 5th surveillance.

Inspections performed at 1, 3, 5, 10, and 15 years after the initial SIT have indicated no abnormal degradation of the post-tensioning system. Therefore, the number of tendons selected for subsequent surveillances complies with Regulatory Guide 1.35 in that at least 2% of the population of each group of tendons (hoop, vertical and dome), or 5 tendons, whichever is less, with a minimum of 3 tendons in each group, will be included.

It will not necessary to enter the Reactor Building at any time during Tendon Surveillance Program activities. Access to the vertical tendon upper anchorage is from the top of the ring girder and access to the lower anchorage is from the tendon gallery. In instances where a tendon is not accessible or acceptable for lift-off tests, Nuclear Plant Technical Support (NPTS) will be notified. If the tendon was identified to be inspected it will be exempted from this surveillance and NPTS will select an alternate tendon as close as possible to the original tendon. The exempted tendon will inspected to the extent that the anchorage areas are accessible either during operation or at an outage. If the tendon was an adjacent tendon, NPTS will select the closest neighboring tendon an adjacent (excluding the reduced force tendons, see Enclosure 6: Reduced Force Dome Tendons).

3.2.2 Hold Points

The "Hold Points" identify steps beyond which work will not proceed until an inspection is performed by a qualified Nuclear Quality Control Inspector. The Site Project Manager for the surveillance, or his designee, must notify the Nuclear Quality Control Supervisor, or his designee, at each "Hold Point".

3.2.3 End Cap Removal and Inspection

The end cap will be removed and inspected for any moisture or free water. If free water is present, samples will be taken for later testing. Two grease samples will be collected from each tendon end for the testing laboratory, see Section 3.2.9: Laboratory Testing. If the end cap shows signs of corrosion it will be cleaned of all grease and sent to the Site Paint Shop for cleaning and re-painting by FPC. The tendon anchorage areas, including the bearing plates and shims, will be inspected for corrosion or other signs of deterioration. The anchorage assembly will be inspected for missing buttonheads, missing, broken, and/or damaged wires or other obvious defects. The degree of corrosion will be compared with that noted at the time of installation or previous tendon surveillance inspections. The thickness of the shim pack will also be measured.

The concrete in the area surrounding the tendon anchorage assembly will be inspected for any large spall, severe scaling, D-cracking (as defined in ACI-201.1R-68), other surface deterioration or disintegration, or grease leakage. NPTS will be notified if any cracks are measured to be wider than 0.010 inch.

In addition to the end caps for the selected tendons, all accessible end caps of the remaining tendons shall be visually inspected for significant grease leakage or end cap deformation.

3.2.4 Lift-Off Measurements

Lift-off will be determined by the following method:

The jacking pressure will be applied to the anchor head until lift-off is achieved. (Note: The jacking force will not exceed 1721 kips based on 163 available wire.) After achieving lift-off 2 feeler gauges (0.030 inch) shall be inserted about 180 degrees apart, between the anchor head washer and the shim. The pressure will then be reduced to transfer the load back to the shim stack. Pressure will be applied to the tendon until the feeler gauge can be pulled out with some effort.

3.2.5 Detensioning

Tendons to be detensioned are listed in Enclosure 2: Identification of Surveillance Tendons - Inspection Period 6. The control tendon shall not be detensioned unless required due to failure to meet acceptance criteria. If it must be detensioned a new control tendon, of the same type, will be selected. The jacking pressure will be increased until the shims can be removed, not exceeding a force of 1721 kips (based on 163 available wires). All buttonheads will be visually inspected for off-size, cracked, and missing heads. Also the anchorage assembly will be inspected for missing, broken, and/or damaged wires. The degree of corrosion will be compared with that noted at the time of installation or previous tendon surveillance inspections.

3.2.6 Wire Removal

Tendons selected for a physical condition test are noted in Enclosure 2: Identification of Surveillance Tendons - Inspection Period 6. One random wire will be removed while the tendon is completely detensioned. Any wires identified as broken will be removed and handled the same as the random wire sample. The wire be measured and inspected for pitting, corrosion, or other signs of deterioration. If there are areas of significant pitting or loss of area on any wire, NPTS will be notified and will determine the course of action. A minimum of 3 samples will be taken for the testing laboratory (see Section 3.2.9: Laboratory Testing). A sample from each end, and one from the middle will be obtained. A fourth sample will be cut from the area of most significant corrosion or pitting, if it exists. The length of each sample shall be the maximum length acceptable for the test apparatus to be used by the testing laboratory.

3.2.7 Retensioning

Tendons to be retensioned shall be stressed to 80% of the minimum ultimate tensile strength of the available wires in the tendon (1868 kips for a 163 available wire tendon). This is performed to minimize the frictional effects on the forces in the overall tendon. During retensioning of the tendon, the elongation of the tendon wires shall be measured and recorded along with the corresponding force at 3 equally spaced intervals. The stressing force will then be reduced to the accepted lift-off or BASE Value (100% value) for final lock-off with a tolerance of -0% to +6%.

At the conclusion of retensioning, all buttonheads will be visually inspected for cracked and/or missing heads. Also, the anchorage assembly will be inspected for broken and/or damaged wires.

3.2.8 Tendon Regreasing

Once all inspections are completed on a tendon the end cap will be replaced with a new O-ring. If any scratches, nicks, and other sharp depressions are present in the gasket bearing surface, a nonmetallic epoxy will be used to repair them prior to end cap installation. The tendon will then be filled with grease.

The grease will be pumped at a minimum temperature of 130°F, but not greater than 210°F. The pressure will not exceed 55 psi at the filler end of the hoop, dome and upper vertical tendon grease cap. The pressure at the lower vertical grease cap will not exceed 125 psi. NPTS will be notified when the absolute difference between the amount of grease removed and the amount of grease pumped is equal to 5% of the net duct volume for a given tendon. Pumping can continue up to 20 gallons beyond this point under NPTS approval.

3.2.9 Laboratory Testing

Testing laboratories qualified by the Surveillance Contractor's Quality Program will be required to perform the following services for this procedure:

- inspect wires for corrosion and other defects
- perform required tensile tests for yield strength, ultimate tensile strength, and elongation
- test bulk filler grease samples for chlorides, sulfides, nitrates, reserve alkalinity, and water content
- test free water samples for pH level

In the event that the testing laboratory finds a wire with significant pitting or loss of area, NPTS will determine the required course of action. An acceptable course of action would be to remove additional wires from the applicable surveillance tendons to be inspected to determine the extent and cause of change. However, each tendon shall have at least 155 wires which meet the acceptance criteria of Enclosure 8, Criteria and Categories for Rating Degrees of Corrosion on Tendon Anchorage Assemblies and Selected Wires, and Enclosure 9, Criteria for Missing, Broken, and/or Damaged Wires.

One grease sample will be sent to the testing laboratory while the remaining sample is held by the surveillance contractor or FPC for possible conformation testing.

3.3 DEFINITIONS

3.3.1 Adjacent Tendons - Adjacent or adjoining tendons are usually on each side of a selected tendon. Reduced Force Dome Tendons, Enclosure 6, are not considered adjacent tendons for a normal selected dome tendon. The next immediate normal tendon shall be considered the adjacent tendon. For hoop tendons located at the very bottom or top of a grouping, the next 2 tendons directly above or below, respectively, are considered the adjacent tendons.

3.3.2 Anchor Head (stressing washer) - round flat piece of steel that the tendon buttonheads bear.

3.3.3 Anchorage - components that distribute the forces in the tendon to the concrete containment structure.

3.3.4 BASE or BASE Curve (Predicted) - A plot of the predicted tendon force versus time accounting for prestress losses based on the criteria provided in Regulatory Guide 1.35.1, Revision 0. The base curve corresponds to the "prescribed lower limit" as defined in Regulatory Guide 1.35, Revision 3.

3.3.5 Bearing Plate (baseplate) - steel plate embedded in the concrete containment that the anchor head transfer the tendon load to.

3.3.6 Buttonhead - the end of the tendon wire that transfers the tendon load to the anchor head.

3.3.7 Corrosion Protection Medium (grease, filler material) - wax and oil compound that fills the tendon cavity to protect against corrosion.

3.3.8 Elongation - the distance that a tendon wire stretches under load.

3.3.9 End Cap - steel container that protects the tendon anchorage and is bolted to the bearing plate.

3.3.10 <u>Free Water</u> - moisture of a quantity that is observed collected or draining out from the end cap during inspection.

3.3.11 <u>Hold Point</u> - point beyond which work will not proceed until an inspection is performed and sign-off by a qualified Nuclear Quality Control Inspector.

3.3.12 <u>Lift-Off</u> - the force (or pressure) required to separate the anchor head form the shim stack.

3.3.13 <u>Lock-Off</u> - the force (or pressure) when the tendon load is transferred to the shim stack.

3.3.14 <u>Minimum Required Prestress Levels</u> - Average prestress force levels which satisfy the design load conditions for maintaining the structural integrity of the containment. Force levels for this average prestress condition are 1215 kips for the dome tendon group, 1149 kips for the vertical tendon group, and 1252 kips for the hoop tendon group.

3.3.15 <u>Normalization Factor</u> - Factors for each individual tendon which are based upon the original tendon stressing sequence of installation. The normalization factor accounts for the effects of elastic shortening.

3.3.16 <u>Overstress</u> - the force (or pressure) that is approximately the yield strength of the tendon (80% of the minimum ultimate tensile strength).

3.3.17 <u>Pit</u> - An indentation visible to the unaided eye. A pit is caused by corrosion and is not the result of mechanical damage to the wire.

3.3.18 <u>Ram</u> - hydraulic jacking device used to apply force to a tendon.

3.3.19 <u>Sheathing</u> (cavity, conduit, duct, void) - thin-walled pipe in the concrete containment that the tendon wires pass through.

3.3.20 <u>Shims</u> - steel plates inserted between the anchor head and the bearing plate.

3.3.21 <u>Stressing Adaptor</u> (coupler) - threaded device that connects the ram to the anchor head.

3.3.22 <u>Tendon</u> - name for combination of wires and anchor heads.

3.3.23 <u>Tendon Identification Number</u> - the numbering convention for locating the tendons:

Dome:	D <u>xxx</u>	where:		
Vert:	<u>y</u> V <u>xx</u>	xxx or xx	=	sequence numbers
Hoop:	<u>yz</u> H <u>xx</u>	y or z	=	buttress numbers

3.3.24 <u>Trumpet</u> - the portion of the sheathing connected to the bearing plate (larger diameter then the sheathing).

3.3.25 <u>Wire</u> - 7 mm diameter wire.

3.4 RESPONSIBILITIES

3.4.1 Surveillance Contractor - This procedure is designed and written for work to be performed by an experienced Surveillance Contractor. The Surveillance Contractor, Precision Surveillance Corporation for the 6th Tendon Surveillance, shall be responsible for assuring that all individuals under its supervision are properly trained in the use of this procedure, their inspection manual and associated equipment. The work supervisor is responsible for performance of the step by step instructions of this procedure, and their inspection manual and for assuring that work is completed satisfactorily and QC is notified for data collection/inspection steps.

3.4.2 Site Project Manager - Responsible for coordinating site support activities for the Surveillance Contractor.

3.4.3 Nuclear Plant Technical Support (NPTS), or its designee. - Is responsible for providing technical support and for the evaluation and disposition of problems as identified during the surveillance. This includes responsibility for the general walkdown and inspection of the containment, and for the documentation of the results of this inspection.

3.4.4 Nuclear Quality Control (NQC) Supervisor, or designee. - Is to be notified at each "Hold Point" within this procedure and is responsible for providing the required QC inspection personnel.

3.4.5 Nuclear Quality Control Inspector - Is responsible for performing QC inspections as indicated within this procedure, and for the recording and documentation of all inspections. The QC Inspector is responsible for providing the documented approval to proceed at each "Hold Point".

3.4.6 Responsible Engineer (RE) - A Registered Professional Engineer experienced in evaluating the in-service condition of structural concrete. The RE is responsible for development of inspection procedures, approval of examination personnel, evaluation of results, and the preparation of repair procedures.

3.5 LIMITS & PRECAUTIONS

3.5.1 General

3.5.1.1 Work must be in compliance with the safety requirements of OSHA, and the FPC Accident Prevention Manual.

3.5.1.2 Missile shields shall be in place over Spent Fuel Pool "A" during surveillance activities for applicable tendons, if any, as designated in Enclosure 2: Identification of Surveillance Tendons - Inspection Period 6.

3.5.1.3 Missile shields shall be in place when moving any platforms and/or stressing rams over Spent Fuel Pool "A".

3.5.1.4 Dome tendons listed in Enclosure 6, Reduced Force Dome Tendons, are not acceptable for normal lift-off testing; therefore, they shall not be substituted as adjacent tendons.

3.5.1.5 No more than 3 adjacent tendons shall be detensioned at any given time without NPTS concurrence.

3.5.1.6 During plant operation, work cannot be performed in the area between buttress numbers 1 and 3 (see Enclosure 3: Dome Tendon Locations Plan - Inspection Period 6). This is to avoid potential exposure to high pressure steam from the steam vents.

3.5.2 <u>Filler Material</u>

3.5.2.1 A certified test report bearing 2 signatures for the grease specified in Step 3.7.1.25 is required. The water soluble chloride and sulfide content must not exceed 2 ppm. The water soluble nitrate content must not exceed 4 ppm.

3.5.2.2 The reuse of filler material in the end cap is acceptable provided a Surveillance Contractor supplied procedure for reuse is accepted by FPC. All grease drained or removed from the anchorage area and tendon cavity shall be disposed of as waste grease.

3.5.2.3 Care must be taken when removing the end cap since the filler material may drop off or drip as a medium viscous liquid.

3.5.2.4 At the lower anchorage, the entire column of filler material may drain from the tendon during end cap removal.

3.5.2.5 Samples of the grease shall be taken prior to cleaning of the anchorage area.

3.5.2.6 Do not use metal implements to remove filler material from around the anchorage. Wooden or plastic instruments may be used.

3.5.2.7 Grease temperatures within the 55-gallon drum must not exceed 210°F.

3.5.3 Equipment

3.5.3.1 Calibration of all equipment used to measure tendon force shall be done in accordance with a calibration procedure prior to the first tendon force measurement and after the final tendon force measurement. Accuracy of the calibration shall be within 1.5% of the specified minimum ultimate strength of the tendon. Calibration of all measuring devices must be signed, dated, and traceable to the National Institute of Standards and Technology (NIST) documentation.

3.5.3.2 Verification of calibration of the stressing jack-pressure gauge systems must be checked daily against a master pressure gauge which is used only for this purpose.

3.5.4 Inspection and Testing

3.5.4.1 "Hold Points" must be verified by a qualified NQC Inspector(s) to comply with the requirements of Appendix B, Criterion X of 10CFR50.

3.5.4.2 Provide sufficient manpower to remove the end caps. The weight of each end cap with grease is about 225 lbs.

3.5.4.3 Once the inspection of a given tendon end has begun, it should be completed as soon as possible to avoid unnecessary exposure of the anchor head.

3.5.4.4 Do not leave the anchorage area and the end cap unprotected when work is not being performed. Tendon anchorages which have been cleaned of grease for an inspection, shall be protected by applying a coat of grease to all exposed surfaces prior to the temporary or permanent installation of the end cap.

3.5.4.5 During inclement weather, provide protection to prevent moisture from entering the end anchorage.

3.5.4.6 The Surveillance Contractor shall confirm that the proper stressing adaptor is attached to the anchor head prior to stressing the tendon.

3.5.4.7 Do not stand behind hydraulic jack while stressing a tendon.

3.5.4.8 Exercise extreme caution if fingers or hands are required near the tendon anchor head during testing.

3.5.4.9 Do not exceed a jack force of 1721 kips (based on 163 available wires) during the tendon stressing without NPTS concurrence, except as stated in Step 3.2.7: Retensioning.

3.5.4.10 Do not detension either tendon end until lift-off has been determined for both ends of a hoop or dome tendon (vertical tendons are detensioned at top end only). Lift-off for each end may be determined on separate days.

3.5.4.11 Detensioning of each tendon end may proceed independently of the other end. However, jacks must not be uncoupled until the tendon is completely detensioned. To alleviate holding jacks under pressure for periods of time, it is recommended that both ends of a tendon be detensioned in unison. This should assist in correct positioning of the anchor head washer.

3.5.4.12 Vertical tendons are detensioned from the top end only, which is the shop end of the tendons. All inspection requirements apply to both top and bottom anchorages.

3.5.5 Wire Removal

3.5.5.1 Verify that all lift-off force measurements and detensioning is complete prior to wire removal.

3.5.5.2 Perform necessary measures when removing and handling tendon wires to preclude wire damage such as scratches, kinks, etc., and to preclude the accumulation of dirt or other contaminants on the surface of the wire.

3.5.5.3 The Surveillance Contractor shall carefully clean removed tendon wires just prior to visual inspection and packaging for delivery to the testing laboratory.

3.5.5.4 Do not stand directly in front of either end of the tendon when a wire is to be cut since some tendons may not be completely detensioned.

3.5.6 Retensioning

3.5.6.1 The Surveillance Contractor shall confirm that the proper stressing adaptor is attached to the anchor head prior to stressing the tendon.

3.5.6.2 Both ends of a hoop or dome tendon shall be retensioned simultaneously in a controlled manner. Maintain approximately the same elongation on both ends of the tendon.

3.5.6.3 It is important that when stressing from both ends that the crew's operation in stressing be coordinated so that a rapid stressing unit does not outpace a slower stressing unit. Ideally, the target gauge pressures must meet at the same time.

3.5.6.4 Vertical tendons only require retensioning from the top of the tendon.

3.5.7 End Cap Installation

3.5.7.1 Detrimental foreign matter (if present) such as loose mill scale, loose rust, loose or flaking paint on the gasket bearing surface can be removed with power tools.

3.5.7.2 A thread chaser may be required to clean the grease cap mounting holes.

3.6 ACCEPTANCE CRITERIA

NOTE: Contingency actions for non-compliance with the following acceptance criteria are provided in Section 5.2: Contingencies.

3.6.1 All documentation has been satisfactorily completed, including all required signatures and dates.

3.6.2 Abnormal conditions determined as the result of a visual inspection of the exterior concrete surface of the containment shall be recorded and documented, and investigated by NPTS for possible degradation of the structure.

Cracks found in concrete adjacent to the tendons (within 2 feet of the bearing plate) having widths greater than 0.010 inch shall be recorded and reported to NPTS for evaluation and resolution. Any crack widths greater than 0.050 inch shall be cause for investigation by NPTS to determine the cause and if there is any abnormal degradation of the structural integrity of the containment.

3.6.3 The wire tensile test shall have no failure below the minimum guaranteed ultimate stress of 240,000 psi. The breaking strength of the sample shall be greater than the minimum breaking strength for the wire diameter shown on Enclosure 11: Minimum Wire Break Strengths. Elongation shall meet or exceed the minimum required value for the tendon material. Wire corrosion indicative of metal reduction shall not be present.

3.6.4 Acceptance criteria for tendon force shall be as defined in Steps 3.6.4.1 through 3.6.4.6.

3.6.4.1 _IF_ the measured prestressing force of the selected tendon in a group lies above the BASE value, or is equal to or greater than 95% of the BASE value (as defined on the individual tendon curve Enclosure 15: Predicted Force vs. Time Curves - Inspection Period 6),
THEN the lift-off test is acceptable for that selected tendon.

3.6.4.2 _IF_ the measured prestressing force of a selected tendon in a group is less than 95% but greater than or equal to 90% of the BASE value,
THEN two adjacent tendons shall be checked for their prestressing forces.
_IF_ the measured prestressing forces of each of the second and third tested tendons are equal to or greater than 95% of their BASE value,
AND the measured prestressing force in all remaining tendons in a group are equal to or greater than 95% of their BASE value,
THEN all three tendons shall be restored to their required BASE value of prestress and the three tendons shall be considered acceptable.

3.6.4.3 _IF_ the measured prestressing force of any two adjoining tendons falls below 95% of their BASE values,
THEN NPTS shall initiate an investigation into the causes of the occurrence. This condition is unacceptable and is considered reportable.

3.6.4.4 _IF_ the measured prestressing force of the selected tendon lies below 90% of the BASE value,
THEN the tendon shall be considered defective. NPTS shall initiate an investigation, and determine the extent and cause of such occurrence and the required course of action to be taken. This condition is unacceptable and is considered reportable.

3.6.4.5 The normalized average of all measured tendon forces for each tendon group (i.e., dome, vertical, hoop) shall be greater than the minimum required prestress level for that group (as defined in Step 3.3.14). NPTS shall review and disposition any conditions where this is not met.

3.6.4.6 NPTS shall review the results and trends of the measured prestress forces from consecutive surveillances.
_IF_ it is determined that the trend of prestress loss for individual tendons, or for any of the three groups of tendons is larger than expected,
THEN NPTS shall determine the cause and extent of such occurrence.
_IF_ this trend indicates that the resulting prestress forces will be less than the minimum required prestress forces prior to the next scheduled surveillance,
THEN additional testing and evaluation shall be performed prior to the completion of the current surveillance to determine the cause and extent of such occurrence. This condition is unacceptable and is considered reportable.

3.6.5 Acceptance criteria for sheathing filler samples shall be as defined in Steps 3.6.5.1 through 3.6.5.6.

3.6.5.1 Water content shall not exceed 10% by weight.

3.6.5.2 Water soluble chlorides, nitrates, and sulfides shall not exceed 10 ppm.

3.6.5.3 Reserve alkalinity (base numbers) shall not be less than 50% of the installed value or less than zero when the installed value was less than 5. If the tendon duct is filled with a mixture of materials having various as-installed base numbers, the lowest number shall govern acceptance.

3.6.5.4 The absolute difference between the amount of grease removed and the amount of grease replaced on a given tendon shall not exceed 5% of the net duct volume.

3.6.5.5 Any grease leakage determined as a result of surveillance inspection activities shall be investigated and repaired using an NPTS approved procedure.

3.6.5.6 Presence of free water shall be measured, sampled and documented and evaluated by NPTS.

3.6.6 During detensioning and retensioning of tendons, if the elongation corresponding to a specific load differs by more than +/- 10% from that recorded during installation an investigation shall be made by NPTS to ensure that the difference is not related to wire failures or wire slips in anchorages. This condition is unacceptable and is considered reportable.

3.7 PREREQUISITES

3.7.1 Equipment

The equipment items listed in this section are recommended for implementation of this inspection.

3.7.1.1 Mobile crane with sufficient capacity and boom length to perform all necessary lifts of equipment and materials into position for surveillance activities.

3.7.1.2 All platforms and rigging, scaffolding, hoisting equipment, and accessories for access to the tendons and for performance of all surveillance work.

3.7.1.3 Two hydraulic stressing jacks (ram) having a loading capacity of 1000 tons with stressing pumps, pressure gauges, controls, and adjustable ram support device. The range and divisions of the pressure gages must be such as to permit reading of a 1000 ton force within an accuracy of +/- 2%.

3.7.1.4 Portable metal scaffolds as required.

3.7.1.5 Portable platform or plywood to be used for supporting the tendon end cap when removed (2 feet x 2 feet minimum).

3.7.1.6 Grease pump, transmission lines, various fittings, etc., connected to 55-gallon drum, equipped with heating system to heat grease to a temperature between 130°F and 210°F.

3.7.1.7 Containers, such as 55-gallon drums, to hold bulk filler grease removed from end anchorages during inspection.

NOTE: Permanent 460 volt electrical outlets exist on the top surface of the ring girder.

3.7.1.8 Electrical cables or heavy duty extension cords as necessary for lights, hydraulic stressing jack pumps, and other miscellaneous power tools.

3.7.1.9 Portable lights for illuminating tendon anchorage assemblies during check for corrosion and defects.

3.7.1.10 A set of portable communications equipment for communicating between crews at each end of the tendon being inspected.

3.7.1.11 Feeler gages (required range of blade sizes: 0.025 inch to 0.035 inch by 0.001 inch increments).

3.7.1.12 Optical comparators with 0.005 inch accuracy for measuring crack widths in concrete.

3.7.1.13 Grid paper for showing crack patterns.

3.7.1.14 Magnifying glass, 5X.

3.7.1.15 Temperature gauge(s) with a range of 0°F to 300°F and an accuracy of +/- 2% of full scale.

3.7.1.16 Wrenches to remove grease can hold down studs (3/4") and nuts.

3.7.1.17 Extraction tool for removing wires subject to tensile tests.

3.7.1.18 Come-along hoist for applying force to wire extraction tool in Step 3.7.1.17 (or similar device).

3.7.1.19 Torque wrench for end cap replacement, 40 ft-lb through 75 ft-lb. minimum capacity.

3.7.1.20 Six-foot diameter wire coiler to coil the removed wire.

3.7.1.21 Small portable power tools (e.g., electric drill, saw, etc.) as required.

3.7.1.22 Wire cutters to cut wires 3/8" diameter (maximum).

3.7.1.23 Wire brush.

3.7.1.24 Steel hand hammer (approximately 24 oz.).

NOTE 1: The quantity is an estimate only; more or less may be required.

NOTE 2: The grease supplier must be acceptable to FPC and qualified by the Surveillance Contractor's Quality Program for approving subcontractors and material suppliers.

NOTE 3: A certified test report bearing two signatures for the grease is required, indicating the water soluble chloride, sulfide, and nitrate content. The tests must be in accordance with the references specified in Section 2.1.1: Codes and Standard References. The water soluble chloride and sulfide content must not exceed 2 ppm and the water soluble nitrate content must not exceed 4 ppm.

NOTE 4: The reuse of grease from the end cap is acceptable provided a vendor-supplied procedure for reuse is accepted by FPC in writing.

3.7.1.25 Ten certified 55-gallon drums of bulk filler grease (Visconorust 2090-P2, 2090-P4 or latest compatible formulation, by Viscosity Oil Company).

NOTE: Chemical composition of solvent must be certified to meet requirements for Viscosity #16.

3.7.1.26 Solvent that can be used for removing grease from around tendon anchorage and cleaning any stained concrete (Viscosity #16 solvent by Viscosity Oil Company, or equal solvent certified to meet the requirements for Viscosity #16, as approved by NPTS).

NOTE: Specifications of replacement materials delineated in Steps 3.7.1.27 through 3.7.1.31 shall be the same as those of the original items.

3.7.1.27 New O-rings for hoop, dome, and upper vertical tendon end caps (1/2" dia., 60 durometer, neoprene or nitrile base rubber, 14-1/2" ID x 15-1/2" OD).

3.7.1.28 New O-rings for lower vertical tendon end caps (5/8" dia. 60 durometer, neoprene or nitrile base rubber, 15-3/8" ID x 16-5/8" OD).

3.7.1.29 3/4" dia x 4-1/2", 10 TPI, material ASTM A193 Grade B7 studs, hex nuts (ASTM A194 Grade 2H), and washer assemblies.

3.7.1.30 3/4"-10 thread per inch thread chaser.

NOTE: Quantity is estimate only; more or less may be required.

3.7.1.31 Wire split increment shims of various thicknesses: 30 sets 3/16", 25 sets 1/4", 20 sets 3/8", 20 sets 1/2". Material to be ARMCO VNT single normalized ASTM A633, Grade E or equal.

3.7.1.32 Supply of clean rags for cleanup with solvent around anchorages.

3.7.1.33 Wooden or plastic paddles or spatulas to scoop out bulk filler grease from around the anchorage assembly.

3.7.1.34 Carbo Zinc 11, zinc-filled inorganic coating, (made by Carboline Co., or equal, as determined by the NPTS and the manufacturer).

3.7.1.35 Non-metallic Epoxy.

3.7.1.36 Any other miscellaneous material and tools as required.

3.7.2 Initial Conditions

3.7.2.1 Perform a Pre-Job Briefing for each new crew/shift in accordance with AI-607, Pre-Job and Post-Job Briefings. This briefing is required once at the start of the work by that crew. Also, notify the Shift Supervisor on Duty (SSOD), at the beginning of each work day, that work is to begin on this procedure.

3.7.2.2 Missile shields shall be in place over Spent Fuel Pool "A" during surveillance activities for those tendons indicated in Enclosure 2, Identification of Surveillance Tendons - Inspection Period 6, and as defined in Steps 3.5.1.2 and 3.5.1.3.

3.7.2.3 Read and understand the Limits & Precautions, Section 3.5.

3.7.2.4 Read and understand the Description, Section 3.2.

3.7.2.5 Ensure that all applicable equipment listed in Section 3.7.1, Equipment, is available and ready to be used.

3.7.2.6 Ensure that there is adequate access to all tendon end caps of tendons that are to be tested (see Enclosure 2: Identification of Surveillance Tendons - Inspection Period 6).

3.7.2.7 Ensure that the testing laboratory indicated in Step 3.2.9 is prepared to receive the wires.

3.7.2.8 Ensure that the testing laboratory indicated in Step 3.2.9 is prepared to receive the grease and free water samples.

3.7.2.9 Ensure references listed in Section 2.0, References, are available for use.

3.7.2.10 Ensure that all personnel are familiar with the operating manuals of the equipment to be used during the inspection.

NOTE: Calibrated equipment must be re-calibrated at the end of the tendon surveillance program by the Post-Test Due Date in accordance with the requirements of that item.

3.7.2.11 Verify that stressing jacks, pressure gauges, comparators, and all other measuring devices have been calibrated per Step 3.5.3.1 and are in good working condition
AND that calibrations are not expected to expire during the time period it will take to perform this surveillance.
IF the calibration is expected to expire prior to completing the surveillance,
THEN have equipment re-calibrated prior to commencing the surveillance.

3.7.2.12 Notify the Radwaste Organization that waste grease will need proper disposal.

3.7.2.13 Notify the NQC Supervisor or his designee that work is to begin on this procedure.

4.0 INSTRUCTIONS

Refer to Precision Surveillance Corporation's Inservice Inspection Manual N604 for the step-by-step instructions to be followed for the 6th Tendon Surveillance at Crystal River Unit #3. The use of a vendor supplied instruction manual is in accordance with Compliance Procedure CP-121, Review and Control of Contractor Procedure or Instructions.

Only PRC approved "controlled" copies of PSCs In-Service Inspection Manual N604 shall be used for he performance of this surveillance.

5.0 FOLLOW-UP ACTIONS

5.1 RESTORATION INSTRUCTIONS

5.1.1 System restoration is accomplished during performance of Section 4.0: Instructions.

5.1.2 Repair procedures shall be developed and preformed accordance with IWL-4000.

5.1.3 Post repair system pressure testing requirements shall be developed and performed in accordance with IWL-5000.

5.1.4 Reinstallation and replacement requirements of the post-tensioning system shall be developed and performed in accordance with IWL-7000.

5.2 CONTINGENCIES

5.2.1 IF the acceptance criteria of Step 3.6.4.5 is not met
AND engineering evaluation can not ascertain acceptability of the containment tendons,
THEN refer immediately to the "Action Statement" of Technical Specification 3.6.1, Containment, and Technical Specification 5.7.2, Special Reports.

5.2.2 IF any of the acceptance criteria of Steps 3.6.2, 3.6.3, 3.6.4.3, 3.6.4.4, 3.6.4.6, 3.6.5, and 3.6.6 are not met,
THEN it shall be treated as an indication of possible abnormal degradation of the containment structure and must be reported to the NRC.

5.2.3 IF there is rejectable corrosion or pitting on the wire as defined in Enclosure 8, Criteria and Categories For Rating Degrees of Corrosion on Tendon Anchorage Assemblies and Selected Wires,
OR, if existing broken or unseated wires and/or detached buttonheads were not documented and accepted during a pre-service examination or during previous inspections,
OR, if the number of missing, broken, and/or damaged wires does not meet the criteria of Enclosure 9, Criteria For Missing, Broken, and/or Damaged Wires,
AND, subsequently, has been rejected by NPTS,
THEN each case shall be treated as an indication of possible abnormal degradation of the containment structure and must be reported to the NRC.

5.2.4 IF there is rejectable corrosion, pitting, or cracking, as defined in Enclosure 8, Criteria and Categories For Rating Degrees of Corrosion on Tendon Anchorage Assemblies and Selected Wires, on the tendon anchorage assembly,
THEN it shall be treated as an indication of possible abnormal degradation of the containment structure and must be reported to the NRC.

5.2.5 IF the post-test calibration of the equipment used to measure tendon force (Step 3.5.3.1) differs from the pretest calibration by more than the specified accuracy tolerance,
THEN the results of the examination shall be evaluated by NPTS.

5.3 REPORTS

5.3.1 Surveillance Contractors Report

A written report documenting the inspection results, laboratory test results and surveillance conclusions for each inspection period must be prepared and submitted to FPC within 60 days of completion of the inspections and tests. The surveillance contractor's approved report and all data must be forwarded to NPTS.

5.3.2 Reportable Conditions

In the event that the acceptance criteria in Section 3.6, Acceptance Criteria is not met, the Surveillance Contractor shall notify NPTS within 1 working day. NPTS shall follow the reporting process defined in CP-151: External Reporting Requirements (Step 2.1.3.5). If NPTS determines that there is abnormal degradation of the containment structure (based on the contingency actions in Section 5.2: Contingencies), FPC shall submit a report to the NRC within 30 days of the initial detection of the possible degradation by the Surveillance Contractor. This report shall include a description of the tendon condition, the condition of the concrete (at the tendon anchorage), the inspection procedures, the tolerances on cracking, and the corrective action taken.

5.3.3 Procedure Closure

Upon completion of each Tendon Surveillance, NPTS is to ensure that SP-182 and Precision Surveillance Corporation Manual N-604 are transmitted to Records Management in accordance with AI-400E.

5.3.4 Evaluation Summary Report

A written summary report of the results and conclusions for each inspection period must be prepared within 90 days of the completion of the tests and inspections.

Items that did not meet the acceptance criteria and were evaluated by NPTS shall be included stating:

- the cause of the condition which did not meet the acceptance criteria
- the acceptability of the concrete containment without repair of the item
- whether or not repair or replacement is required and, if required, the extent, method, and completion date for the repair or replacement
- extent, nature, and frequency of additional examinations

This report shall be maintained on file.

IDENTIFICATION OF SURVEILLANCE TENDONS FROM PRIOR SURVEILLANCE PERIODS

	1ST SURVEILLANCE 11/77-2/78	2ND SURVEILLANCE 3/80-5/80	3RD SURVEILLANCE 9/81-12/81	4TH SURVEILLANCE 9/87-11/87	5TH SURVEILLANCE 11/93-1/94
DOME TENDONS 123 TOTAL 3 GROUPS OF 41 D100s, D200s, D300s	D139 D215 D221 D D228 D234 D340	D122 D140 D208 D D323 D331	D123 D125 D212 D322 D D329	D105 D D212 D328	D215 D231 D D224
VERTICAL TENDONS 144 TOTAL 6 GROUPS OF 24 12, 34, 56, 23, 45, 61	12V19 12V20 12V21 23V15 34V6 45V3 D 56V1	12V12 12V20 23V5 34V1 45V6 56V20 56V1 D	12V1 34V6 34V19 D 45V16 56V11 61V5	12V1 34V4 56V2 D	34V6 56V15 D 61V14
HORIZONTAL TENDONS 282 TOTAL 6 GROUPS @ 47 HIGH, 13, 24, 35, 46, 51, 62	13H10 13H19 13H37 13H47 51H11 62H9 64H21 64H29 64H37 D 64H46	13H22 13H32 D 13H43 51H10 51H23 51H37 53H24 53H28 53H44 64H42	13H19 13H46 42H20 42H40 51H26 51H45 53H35 53H40 62H34 64H10 D	13H20 13H40 D 51H26 51H41 64H19	35H1 42H1 46H21 46H28 46H29 D 46H30 46H47 D 62H8
TENDONS INSPECTED	23	22	21	11	14
TOTAL TENDONS = 549					
TOTAL TENDONS INSPECTED UP TO 5TH SURVEILLANCE = 91					

NOTE: For information only. These tendons were completed in past surveillances.
D - Designates a detensioned tendon.

IDENTIFICATION OF SURVEILLANCE TENDONS
INSPECTION PERIOD 6

SELECTED DOME TENDONS	ADJACENT TENDONS
D113 *	D112, D114
D115 *,E	D114, D116
D212 C,E	D211, D213
D304 D	D303, D305
D311 E	D310, D312
D131 *,A	

SELECTED VERTICAL TENDONS	ADJACENT TENDONS
12V1 C,E	23V24, 12V2
23V2	23V1, 23V3
61V21 D	61V20, 61V22
61V10 A	

SELECTED HOOP TENDONS	ADJACENT TENDONS
42H18	42H17, 42H19
42H32	42H31, 42H33
42H44 E	42H43, 42H45
51H26 C,E	51H25, 51H27
53H2	53H1, 53H3
53H46 E	53H45, 53H47
62H41 *,D	62H40, 62H42
62H46 *,E	62H45, 62H47
62H22 *,A	

A Denotes alternate tendon. Requires NPTS approval.

C Denotes selected control tendon.

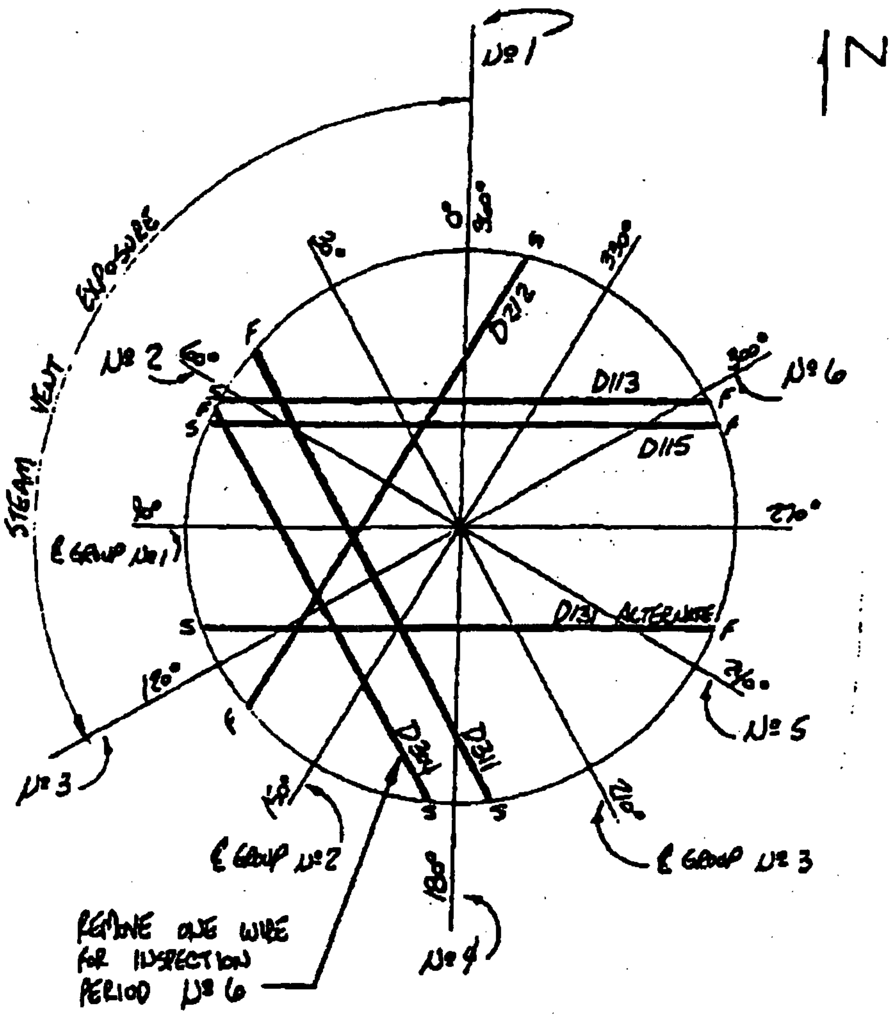
D Denotes selected tendon for detensioning and wire removal. If removal of one wire from tendon would subject it to rejection per Enclosure 9, Criteria For Missing, broken, and/or Damaged Wires, contact NPTS for a substitute tendon.

E Denotes exempted tendons deferred from 5th Surveillance.

* Denotes tendons, if any, which must have missile shields in-place over Fuel Pool "A", per Step 3.7.2.2.

ENCLOSURE 3

DOME TENDONS LOCATION PLAN - INSPECTION PERIOD 6

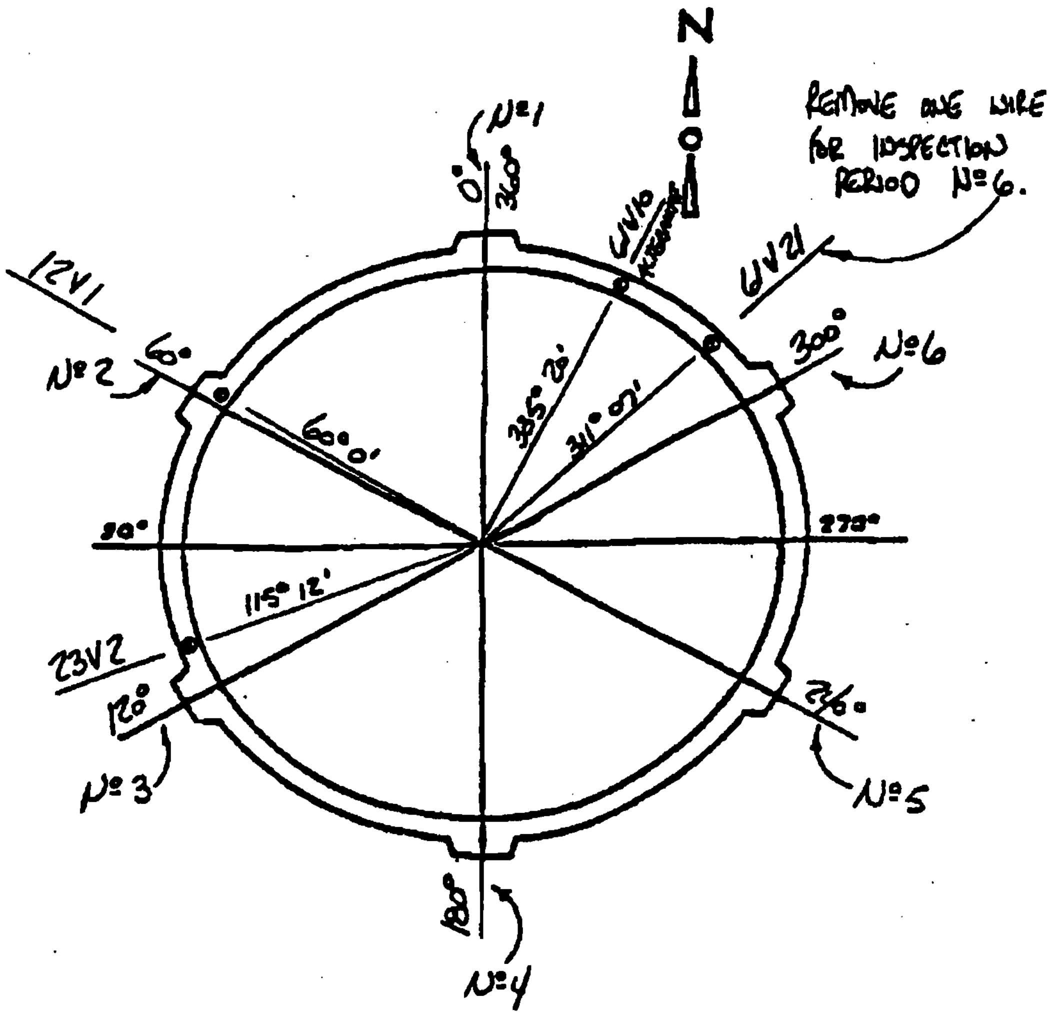


S: Shop End
F: Field End

Note: The indicated shop and field end applies to all tendons within the Group, e.g., for D1xx group tendons-the shop end is the west end.

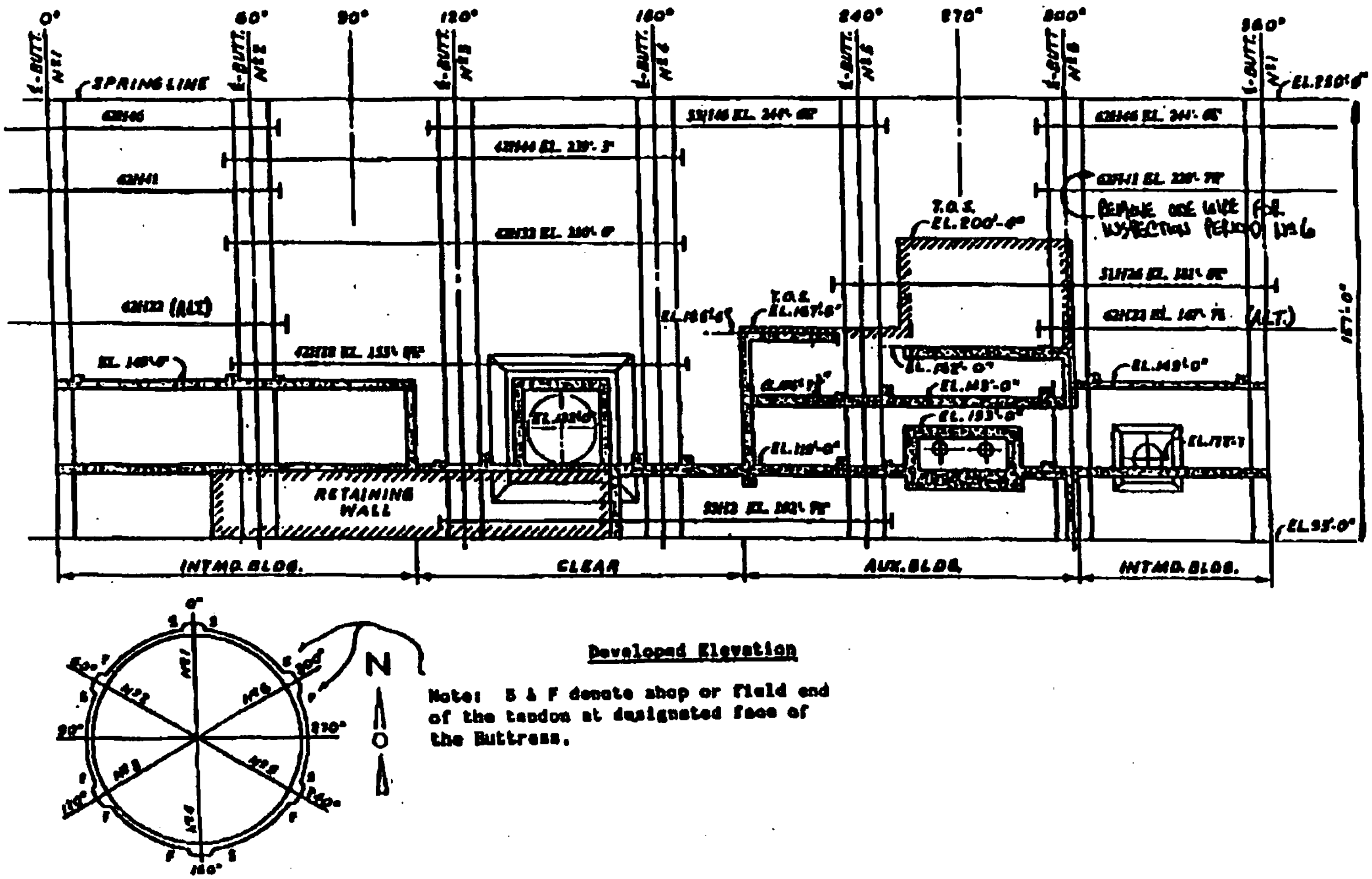
ENCLOSURE 4

VERTICAL TENDONS LOCATION PLAN - INSPECTION PERIOD 6



Shop End - Top
Field End - Bottom

HOOP TENDONS LOCATION PLAN - INSPECTION PERIOD 6



Developed Elevation

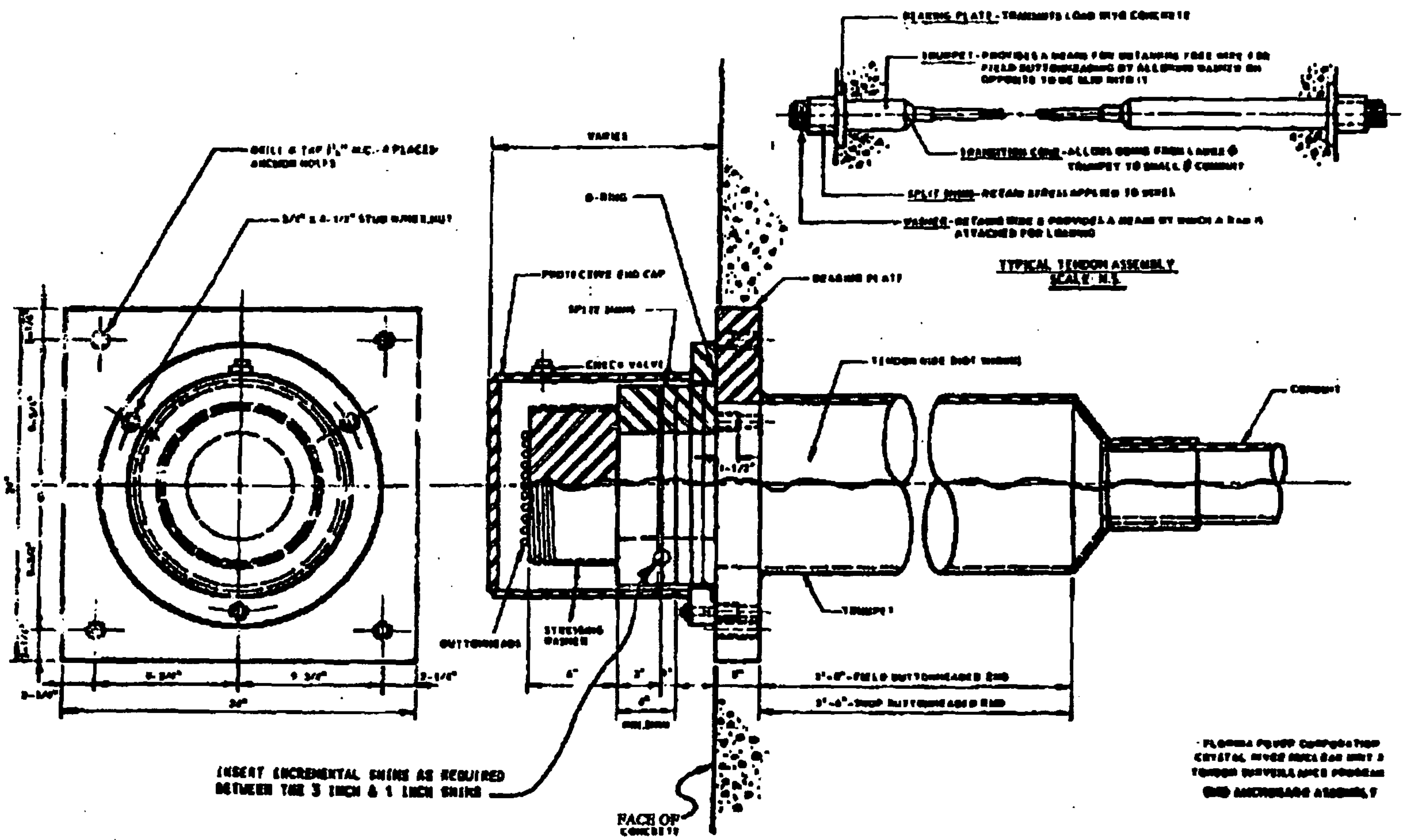
Note: S & F denote shop or field end of the tendon at designated face of the Buttress.

REDUCED FORCE DOME TENDONS

The following tendons are not acceptable for normal lift-off testing:

D 101	D 201	D 301
D 109	D 209	D 309
D 117	D 217	D 317
D 125	D 225	D 325
D 133	D 233	D 333
D 141	D 241	D 341

ANCHORAGE ASSEMBLY DETAIL



CRITERIA AND CATEGORIES FOR RATING DEGREES OF CORROSION ON TENDON ANCHORAGE ASSEMBLIES AND SELECTED WIRES

CATEGORIES OF CORROSION

1. Bright metal; no visible oxidation.
2. Metal reddish brown color, no pitting.
3. Metal having patches of red oxide, removable but ready to start pitting.
4. Metal having patches of red oxide, not removable and/or leaving noticeable pits.
5. Metal having heavy rusting, dark red, and about to form an extremely hard crust which when removed leaves very noticeable pitting.
6. Conditions more severe than Category 5.

ACCEPTANCE CRITERIA

Anchorage assembly components in Category 1, 2, or 3 are acceptable.

Wire in Category 1, or 2 is acceptable.

Anchorage assembly components in Category 4, 5, or 6 and/or wires in Category 3, 4, 5, or 6 should be further evaluated by NPTS.

CRITERIA FOR VISUAL INSPECTION OF GREASE

Note that the original Visconorust 2090-P2 grease is no longer available. The new 2090-P4 grease will not be the exact color as the original 2090-P2 grease when it was new. Therefore, color comparisons of old grease against new grease must be made considering this basic difference.

Note if any of the following items are observed during visual inspection of the grease:

1. Extreme discoloration even when considering the above change in grease type.
2. Presence of corrosive particles and/or dirt mixed within the grease, indicating adjacent metal pitting and metal breakdown.
3. Signs of moisture within the bulk filler.
4. Other signs of grease deterioration.

CRITERIA FOR MISSING, BROKEN, AND/OR DAMAGED WIRES

1. Broken wires and unacceptable buttonheads shall not exceed 8 wires per individual tendon, nor more than 2 percent of the total number of wires in that group, nor more than 3 percent in any 10 consecutive tendons in a group. A group shall be defined as follows: Vertical tendons - one stressing sequence quadrant (36 tendons); Dome tendons - one series of layer (41 tendons); Hoop tendons - one side of a buttress (47 tendons).

2. An unseated wire, after stressing, that will move at one end of the tendon but is observed not to move at the other end is to be considered a broken wire.

   Caution - do not strike the buttonhead with any heavy object.

3. If an unseated wire, after stressing, will not move - document and notify NPTS.

NOTE: Missing, broken, and/or damaged wire criteria is based on original quantity of 163 wires per tendon.

ORIGINAL ACCEPTANCE CRITERIA FOR BUTTONHEADS

PRESCON BUTTONHEADS - 0.275"ϕ/ (7 mm) WIRE

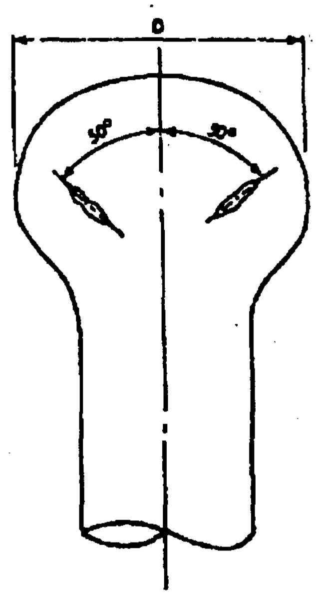
1. DIMENSIONS

Diameter - D	
Minimum	0.410"
Maximum	0.450"

2. SPLITS

Maximum admissible number	4
Maximum admissible width	0.060" Per Split
Maximum admissible length	0.350" Per Split
Maximum admissible angle to axis of wire	50°

NOTE: This is the criteria for new buttonheads and is given in this detail for reference only. The checks called for in Section 4.0, Instructions, of the procedure are not meant to verify these numbers, but they are meant to detect obvious gross deficiencies in any buttonhead.



MINIMUM WIRE BREAK STRENGTHS

(Tinius-Olson Direct Reading - High Scale or Equal)

WIRE DIAMETER (inch)	CROSS SECTIONAL AREA (sq in)	ULTIMATE TENSILE STRENGTH	MINIMUM BREAK (kips) (1,000 lbs)
0.27359 (-)	0.05879	240 ksi	14.110
0.27459 (-)	0.05922	240 ksi	14.213
0.27559 (7 mm)	0.05965	240 ksi	14.316
0.27659 (+)	0.06008	240 ksi	14.316+
0.27759 (+)	0.06052	240 ksi	14.316+

ORIGINAL STRESSING AVERAGE TENDON LIFT-OFF VALUES
VERTICAL TENDONS

TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF
12 V 1	1675	34 V 1	1651	56 V 1*	1784
12 V 2	1699	34 V 2	1588	56 V 2*	1603
12 V 3	1687	34 V 3	1597	56 V 3	1694
12 V 4	1651	34 V 4	1585	56 V 4	1658
12 V 5	1711	34 V 5	1633	56 V 5	1696
12 V 6	1586	34 V 6	1609	56 V 6	1622
12 V 7	1574	34 V 7	1646	56 V 7	1633
12 V 8	1615	34 V 8	1621	56 V 8	1602
12 V 9	1634	34 V 9	1605	56 V 9	1654
12 V 10	1615	34 V 10	1709	56 V 10	1598
12 V 11	1669	34 V 11	1605	56 V 11	1658
12 V 12	1670	34 V 12	1696	56 V 12	1646
12 V 13	1675	34 V 13	1644	56 V 13	1685
12 V 14	1687	34 V 14	1648	56 V 14	1687
12 V 15	1625	34 V 15	1655	56 V 15*	1638
12 V 16	1598	34 V 16	1639	56 V 16	1651
12 V 17	1650	34 V 17	1663	56 V 17	1617
12 V 18	1639	34 V 18	1633	56 V 18	1699
12 V 19	1654	34 V 19*	1573	56 V 19	1664
12 V 20	1598	34 V 20	1637	56 V 20	1687
12 V 21	1638	34 V 21	1660	56 V 21	1661
12 V 22	1655	34 V 22	1624	56 V 22	1665
12 V 23	1638	34 V 23	1646	56 V 23	1651
12 V 24	1624	34 V 24	1648	56 V 24	1675
23 V 1	1711	45 V 1	1686	61 V 1	1629
23 V 2	1598	45 V 2	1627	61 V 2	1629
23 V 3	1661	45 V 3*	1639	61 V 3	1627
23 V 4	1670	45 V 4	1610	61 V 4	1663
23 V 5	1711	45 V 5	1649	61 V 5	1643
23 V 6	1670	45 V 6	1614	61 V 6	1658
23 V 7	1636	45 V 7	1607	61 V 7	1675
23 V 8	1676	45 V 8	1675	61 V 8	1598
23 V 9	1627	45 V 9	1661	61 V 9	1625
23 V 10	1616	45 V 10	1677	61 V 10	1598
23 V 11	1673	45 V 11	1696	61 V 11	1643
23 V 12	1646	45 V 12	1603	61 V 12	1610
23 V 13	1687	45 V 13	1673	61 V 13	1711
23 V 14	1646	45 V 14	1697	61 V 14	1646
23 V 15	1615	45 V 15	1625	61 V 15	1590
23 V 16	1598	45 V 16	1661	61 V 16	1628
23 V 17	1660	45 V 17	1683	61 V 17	1646
23 V 18	1598	45 V 18	1661	61 V 18	1598
23 V 19	1598	45 V 19	1624	61 V 19	1591
23 V 20	1633	45 V 20	1624	61 V 20	1634
23 V 21	1663	45 V 21	1629	61 V 21	1622
23 V 22	1622	45 V 22	1672	61 V 22	1622
23 V 23	1639	45 V 23	1634	61 V 23	1663
23 V 24	1634	45 V 24	1684	61 V 24	1616

* Tendons detensioned and/or retensioned during previous inspections

[All Lift-off Values in kips (1000#)]

ORIGINAL STRESSING AVERAGE TENDON LIFT-OFF VALUES (Cont'd)
DOME TENDONS

TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF
D101	643*	D201	652*	D301	660*
D102	1660	D202	1649	D302	1581
D103	1606	D203	1662	D303	1653
D104	1606	D204	1649	D304	1610
D105**	1646	D205	1642	D305	1629
D106	1626	D206	1643	D306	1643
D107	1667	D207	1657	D307	1656
D108	1646	D208**	1648	D308	1646
D109	643*	D209	640*	D309	649*
D110	1622	D210	1616	D310	1636
D111	1673	D211	1689	D311	1682
D112	1676	D212	1600	D312	1640
D113	1676	D213	1646	D313	1636
D114	1670	D214	1642	D314	1621
D115	1700	D215	1666	D315	1607
D116	1646	D216	1614	D316	1604
D117	658*	D217	660*	D317	660*
D118	1563	D218	1626	D318	1635
D119	1642	D219	1639	D319	1697
D120	1652	D220	1619	D320	1653
D121	1633	D221**	1670	D321	1668
D122	1664	D222	1649	D322**	1628
D123	1610	D223	1655	D323	1670
D124	1634	D224	1598	D324	1664
D125	634*	D225	649*	D325	660*
D126	1634	D226	1625	D326	1640
D127	1634	D227	1649	D327	1661
D128	1660	D228	1669	D328	1670
D129	1619	D229	1650	D329	1645
D130	1635	D230	1665	D330	1634
D131	1600	D231**	1651	D331	1636
D132	1620	D232	1603	D332	1667
D133	652*	D233	652*	D333	660*
D134	1640	D234	1643	D334	1598
D135	1673	D235	1632	D335	1669
D136	1679	D236	1591	D336	1616
D137	1562	D237	1661	D337	1622
D138	1645	D238	1664	D338	1638
D139	1686	D239	1615	D339	1639
D140	1669	D240	1615	D340	1634
D141	649*	D241	660*	D341	652*

* Reduced Force Tendons

** Tendons detensioned and/or retensioned during previous inspections

[All Lift-off Values in kips (1000#)]

ORIGINAL STRESSING AVERAGE TENDON LIFT-OFF VALUES (Cont'd)
HOOP TENDONS

TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF
13 H 1	1629	53 H 1	1640	64 H 1	1642
13 H 2	1640	53 H 2	1555	64 H 2	1701
13 H 3	1630	53 H 3	1598	64 H 3	1649
13 H 4	1640	53 H 4	1645	64 H 4	1628
13 H 5	1643	53 H 5	1606	64 H 5	1579
13 H 6	1658	53 H 6	1627	64 H 6	1628
13 H 7	1630	53 H 7	1622	64 H 7	1643
13 H 8	1634	53 H 8	1673	64 H 8	1646
13 H 9	1593	53 H 9	1591	64 H 9	1623
13 H 10	1604	53 H 10	1650	64 H 10*	1646
13 H 11	1606	53 H 11	1584	64 H 11	1635
13 H 12	1598	53 H 12	1663	64 H 12	1616
13 H 13	1691	53 H 13	1615	64 H 13	1649
13 H 14	1604	53 H 14	1609	64 H 14	1680
13 H 15	1624	53 H 15	1651	64 H 15	1589
13 H 16	1595	53 H 16	1639	64 H 16	1616
13 H 17	1630	53 H 17	1603	64 H 17	1617
13 H 18	1618	53 H 18	1657	64 H 18	1670
13 H 19	1625	53 H 19	1604	64 H 19	1617
13 H 20	1604	53 H 20	1633	64 H 20	1665
13 H 21	1642	53 H 21	1634	64 H 21	1653
13 H 22	1652	53 H 22	1651	64 H 22	1665
13 H 23	1649	53 H 23	1609	64 H 23	1637
13 H 24	1646	53 H 24	1621	64 H 24	1653
13 H 25	1643	53 H 25	1663	64 H 25	1657
13 H 26	1628	53 H 26	1650	64 H 26	1635
13 H 27	1618	53 H 27	1627	64 H 27	1655
13 H 28	1658	53 H 28	1626	64 H 28*	1690
13 H 29	1607	53 H 29	1669	64 H 29*	1667
13 H 30	1658	53 H 30	1704	64 H 30	1642
13 H 31	1635	53 H 31	1532	64 H 31	1655
13 H 32*	1653	53 H 32	1668	64 H 32	1635
13 H 33	1623	53 H 33	1646	64 H 33	1648
13 H 34	1641	53 H 34	1632	64 H 34	1702
13 H 35	1631	53 H 35	1604	64 H 35	1655
13 H 36	1650	53 H 36	1655	64 H 36	1678
13 H 37	1629	53 H 37	1664	64 H 37*	1617
13 H 38	1612	53 H 38	1643	64 H 38	1645
13 H 39	1671	53 H 39	1616	64 H 39	1665
13 H 40*	1623	53 H 40	1660	64 H 40	1586
13 H 41	1660	53 H 41	1634	64 H 41	1611
13 H 42	1660	53 H 42	1622	64 H 42	1599
13 H 43	1641	53 H 43	1646	64 H 43	1641
13 H 44	1654	53 H 44	1653	64 H 44	1641
13 H 45	1635	53 H 45	1634	64 H 45	1647
13 H 46	1623	53 H 46	1628	64 H 46	1644
13 H 47	1623	53 H 47	1688	64 H 47*	1623

* Tendons detensioned and/or retensioned during previous inspections

[All Lift-off Values in kips (1000#)]

ORIGINAL STRESSING AVERAGE TENDON LIFT-OFF VALUES (Cont'd)
HOOP TENDONS

TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF	TENDON I.D.	LIFT-OFF
51 H 1	1639	42 H 1	1645	62 H 1	1603
51 H 2	1620	42 H 2	1650	62 H 2	**
51 H 3	1645	42 H 3	1653	62 H 3	1615
51 H 4	1625	42 H 4	1672	62 H 4	1631
51 H 5	1675	42 H 5	1605	62 H 5	1672
51 H 6	1608	42 H 6	1679	62 H 6	1603
51 H 7	1608	42 H 7	1647	62 H 7	1603
51 H 8	1644	42 H 8	1665	62 H 8	1624
51 H 9	1627	42 H 9	1641	62 H 9	1639
51 H 10	1674	42 H 10	1645	62 H 10	1604
51 H 11	1615	42 H 11	1599	62 H 11	1603
51 H 12	1668	42 H 12	1614	62 H 12	1675
51 H 13	1644	42 H 13	1597	62 H 13	1663
51 H 14	1644	42 H 14	1622	62 H 14	1603
51 H 15	1651	42 H 15	**	62 H 15	1681
51 H 16	1649	42 H 16	1635	62 H 16	1627
51 H 17	1663	42 H 17	1661	62 H 17	1675
51 H 18	1608	42 H 18	1664	62 H 18	1609
51 H 19	1669	42 H 19	1647	62 H 19	1640
51 H 20	1668	42 H 20	1662	62 H 20	1610
51 H 21	1669	42 H 21	1641	62 H 21	1640
51 H 22	1638	42 H 22	1668	62 H 22	1663
51 H 23	1609	42 H 23	1617	62 H 23	1639
51 H 24	1644	42 H 24	1617	62 H 24	1639
51 H 25	1639	42 H 25	1647	62 H 25	1627
51 H 26	1661	42 H 26	1614	62 H 26	1663
51 H 27	1612	42 H 27	1635	62 H 27	1669
51 H 28	1668	42 H 28	1632	62 H 28	1633
51 H 29	1629	42 H 29	1629	62 H 29	**
51 H 30	1657	42 H 30	1644	62 H 30	1597
51 H 31	1646	42 H 31	1653	62 H 31	1681
51 H 32	1658	42 H 32	1626	62 H 32	1639
51 H 33	1650	42 H 33	1665	62 H 33	1674
51 H 34	1651	42 H 34	1626	62 H 34	1626
51 H 35	1608	42 H 35	1657	62 H 35	1664
51 H 36	1616	42 H 36	1680	62 H 36	1639
51 H 37	1606	42 H 37	1641	62 H 37	1622
51 H 38	1628	42 H 38	1650	62 H 38	1639
51 H 39	1607	42 H 39	1623	62 H 39	**
51 H 40	1664	42 H 40	1651	62 H 40	1639
51 H 41	1631	42 H 41	1623	62 H 41	1609
51 H 42	1610	42 H 42	1599	62 H 42	1609
51 H 43	1642	42 H 43	1611	62 H 43	1591
51 H 44	1646	42 H 44	1605	62 H 44	1651
51 H 45	1581	42 H 45	1665	62 H 45	1622
51 H 46	1657	42 H 46	1644	62 H 46	1645
51 H 47	1663	42 H 47	1615	62 H 47	1582

** Not Available

[All Lift-off Values in kips (1000#)]

ORIGINAL STRESSING DATA - INSPECTION PERIOD 6

TENDON I.D.	FORCE (kips) @ 1500 psi		FORCE (kips) @ 80% ULTIMATE		ELONGATION (in) @ INSTALLATION	
	SHOP	FIELD	SHOP	FIELD	SHOP	FIELD
D112	362	359	1873	1867	4.75	5.0
D113	362	359	1873	1867	4.875	4.75
D114	362	359	1873	1867	5.125	4.625
D115	359	362	1867	1873	5.0	5.0
D116	364	362	1872	1868	4.75	5.125
D131	366	365	1871	1872	4.5	4.875
D211	361	358	1872	1863	5.25	5.5
D212	363	363	1871	1869	4.625	4.875
D213	359	362	1867	1873	4.75	4.75
D303	364	363	1872	1871	4.25	3.75
D304	359	362	1867	1873	4.125	4.0
D305	367	368	1867	1870	4.125	4.1875
D310	363	363	1869	1871	5.0	4.5
D311	362	359	1873	1867	4.6875	4.625
D312	359	362	1867	1873	4.875	4.875
12V1	362	N/A	1873	N/A	12.5	N/A
12V2	362	N/A	1873	N/A	12.5	N/A
23V1	362	N/A	1873	N/A	12.25	N/A
23V2	358	N/A	1863	N/A	13.125	N/A
23V3	364	N/A	1879	N/A	13.0	N/A
23V24	358	N/A	1863	N/A	12.875	N/A
61V10	358	N/A	1863	N/A	12.75	N/A
61V20	358	N/A	1863	N/A	12.5	N/A
61V21	358	N/A	1863	N/A	12.125	N/A
61V22	358	N/A	1863	N/A	12.875	N/A

ORIGINAL STRESSING DATA - INSPECTION PERIOD 6

TENDON I.D.	FORCE (kips) @ 1500 psi		FORCE (kips) @ 80% ULTIMATE		ELONGATION (in) @ INSTALLATION	
	SHOP	FIELD	SHOP	FIELD	SHOP	FIELD
42H17	358	361	1863	1872	5.625	4.625
42H18	359	362	1871	1868	5.0	5.375
42H19	358	361	1863	1872	5.25	5.0
42H31	358	361	1863	1872	5.25	4.875
42H32	358	362	1863	1871	5.25	5.125
42H33	358	361	1863	1872	5.375	5.25
42H43	358	361	1863	1872	5.5	5.125
42H44	362	359	1871	1867	5.125	5.0
42H45	358	361	1863	1872	5.4375	5.0
51H25	363	362	1869	1868	5.0	5.125
51H26	364	364	1879	1867	5.5	5.25
51H27	365	369	1868	1868	5.125	4.875
53H1	367	364	1871	1872	5.75	5.125
53H2	362	316*	1870	1628*	5.75	4.625
53H3	369	366	1868	1871	5.375	4.125
53H45	359	362	1867	1873	5.25	5.25
53H46	364	365	1879	1865	4.875	5.375
53H47	359	362	1867	1873	4.75	5.5
62H22	362	364	1873	1870	5.3125	5.0
62H40	362	364	1873	1870	5.375	4.875
62H41	362	364	1873	1870	5.25	5.0
62H42	362	364	1873	1870	5.375	5.0625
62H45	364	367	1884	1884	5.1875	5.125
62H46	362	364	1873	1870	5.125	5.375
62H47	368	370	1870	1864	5.625	4.5

* Numbers appear low due to suspected transcribing mistake on Tendon History Sheet

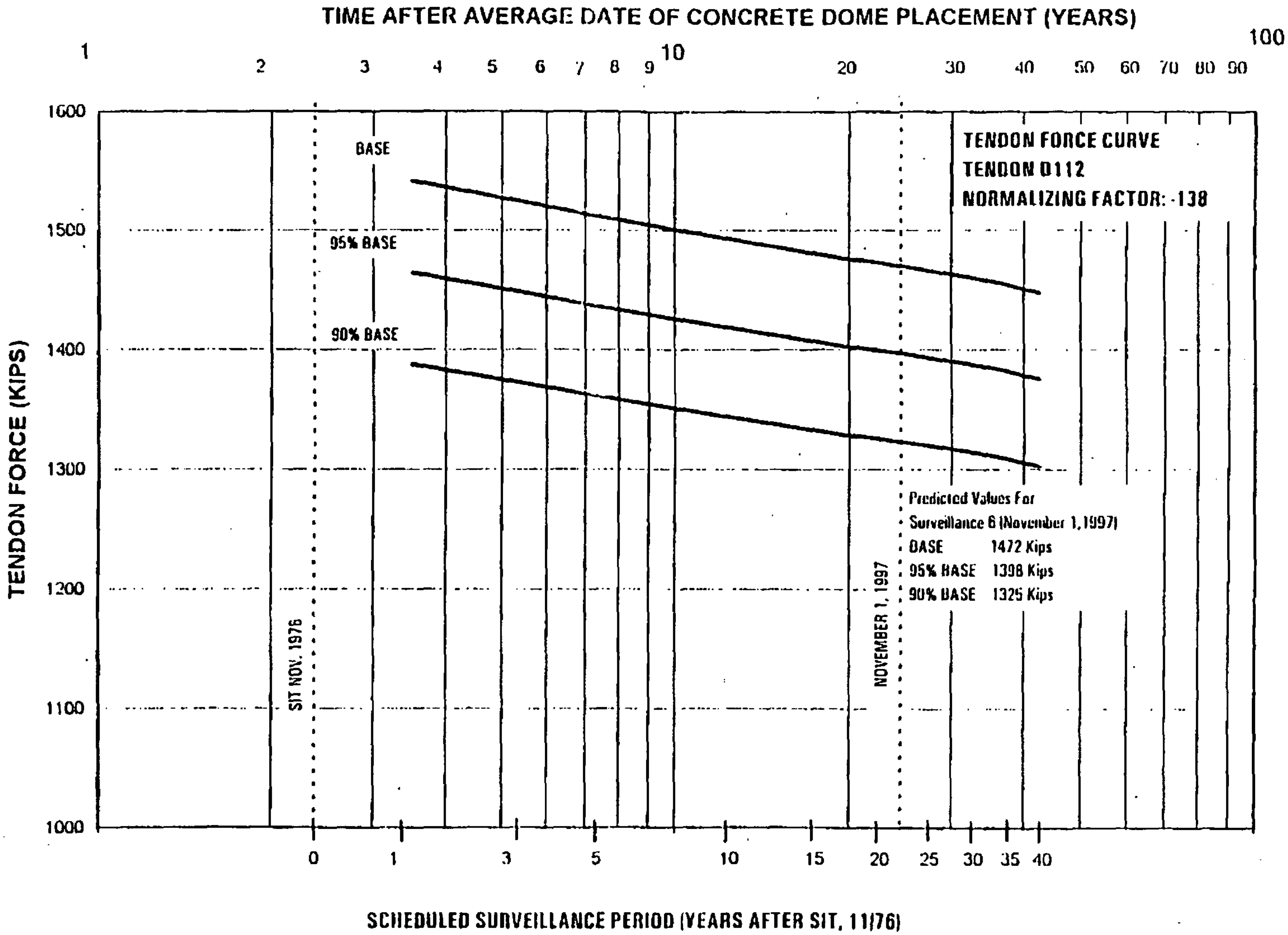
TENDON NORMALIZING FACTORS - INSPECTION PERIOD 6

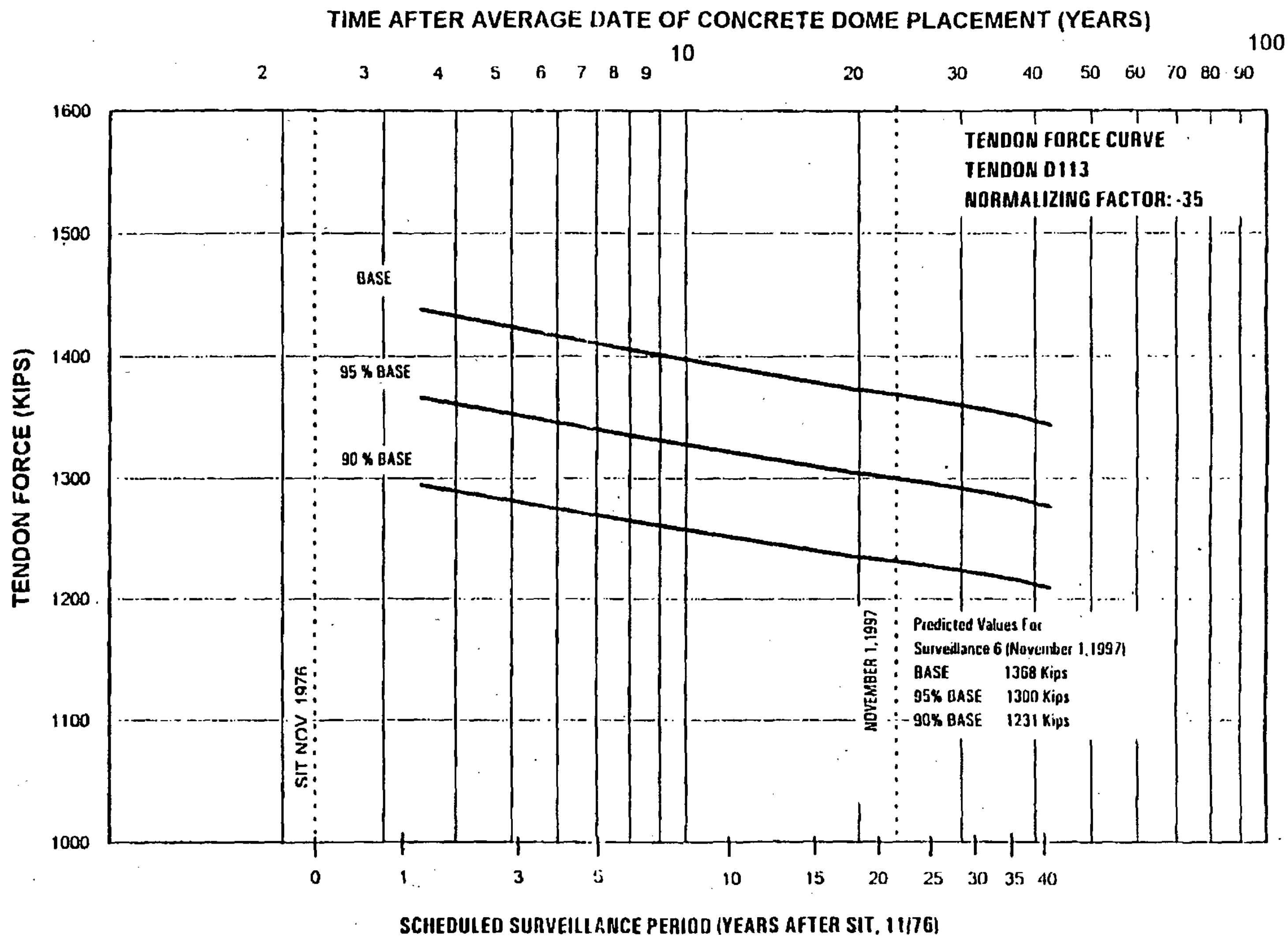
DOME TENDONS		VERTICAL TENDONS		HOOP TENDONS	
TENDON I.D.	NORMALIZING FACTOR	TENDON I.D.	NORMALIZING FACTOR	TENDON I.D.	NORMALIZING FACTOR
D112	-138	12V1	-9	42H17	-17
D113	-35	12V2	-80	42H18	-56
D114	-132	23V1	-30	42H19	-4
D115	-12	23V2	37	42H31	-21
D116	-90	23V3	-2	42H32	-15
D131	-46	23V24	-9	42H33	-35
D211	18	61V10	21	42H43	11
D212	15	61V20	-21	42H44	10
D213	10	61V21	38	42H45	-44
D303	32	61V22	-3	51H25	38
D304	-64			51H26	-75
D305	8			51H27	71
D310	-11			53H1	29
D311	0			53H2	12
D312	-93			53H3	46
				53H45	62
				53H46	-35
				53H47	10
				62H22	-53
				62H40	-23
				62H41	16
				62H42	7
				62H45	-1
				62H46	-27
				62H47	35

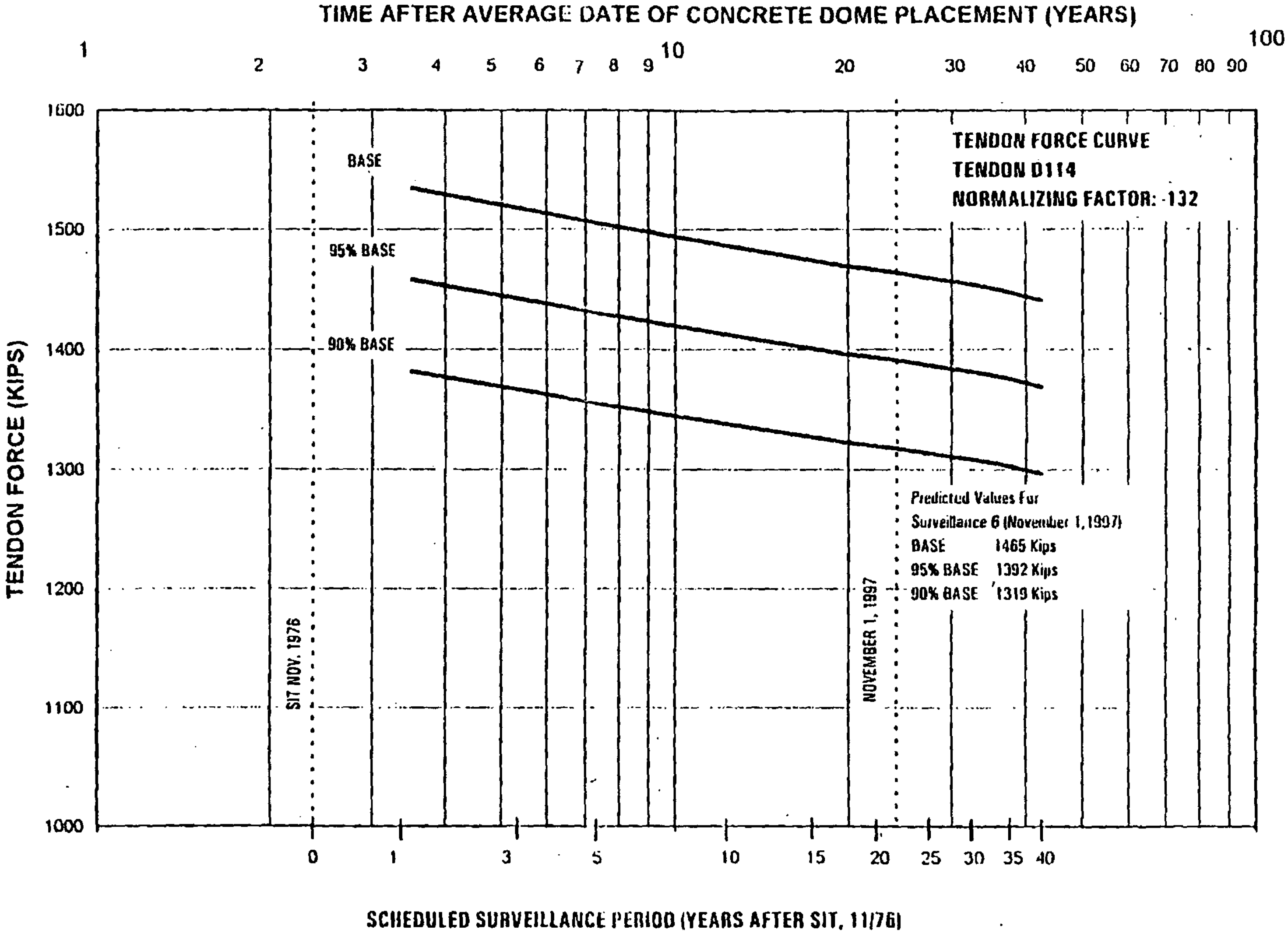
PREDICTED FORCE VS. TIME CURVES - INSPECTION PERIOD 6

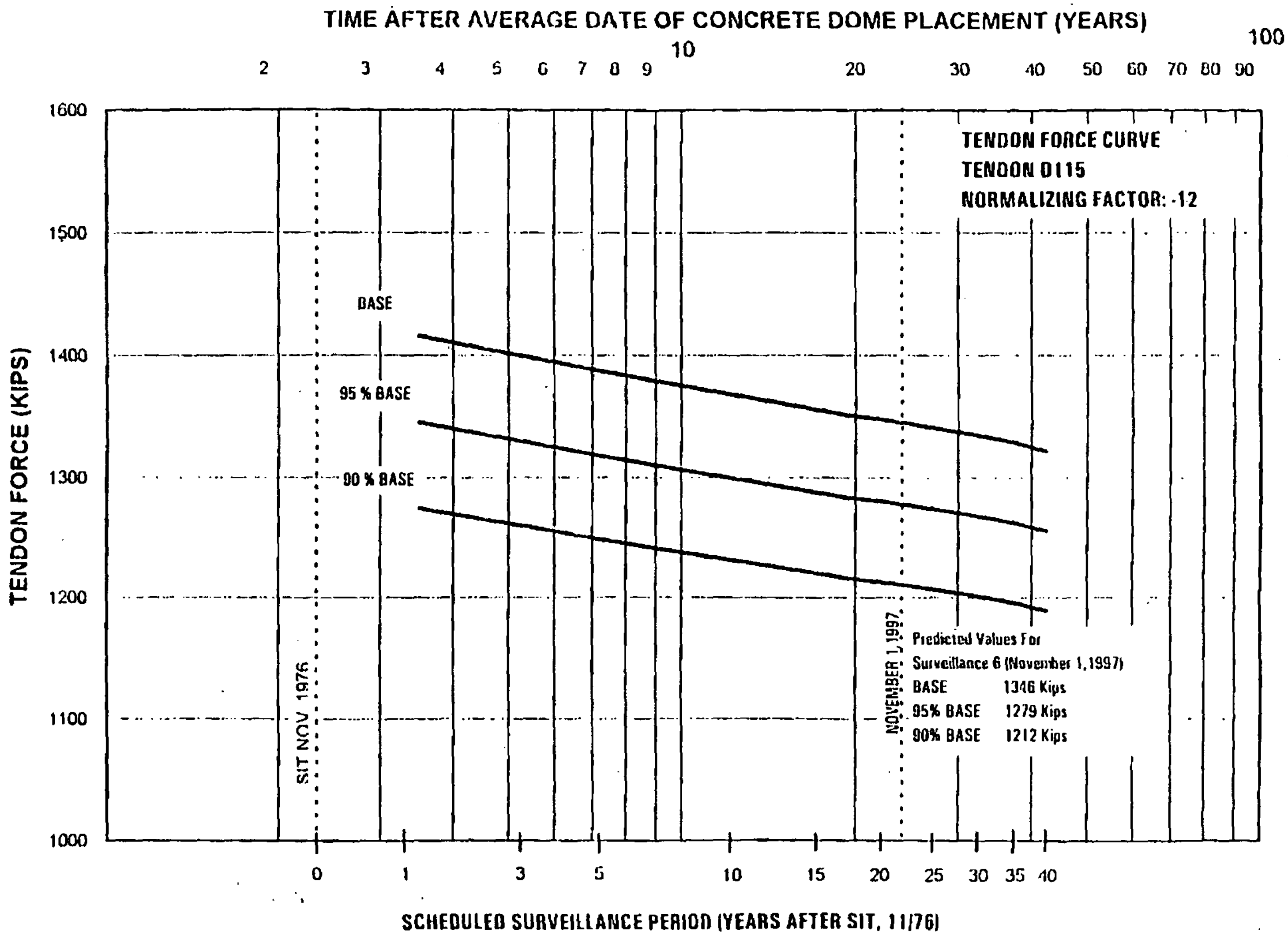
This Enclosure consists of the Predicted Force versus Time Curves for the selected, adjacent and alternate tendons included as presented in Enclosure 2, Identification of Surveillance Tendons - Inspection Period 6.

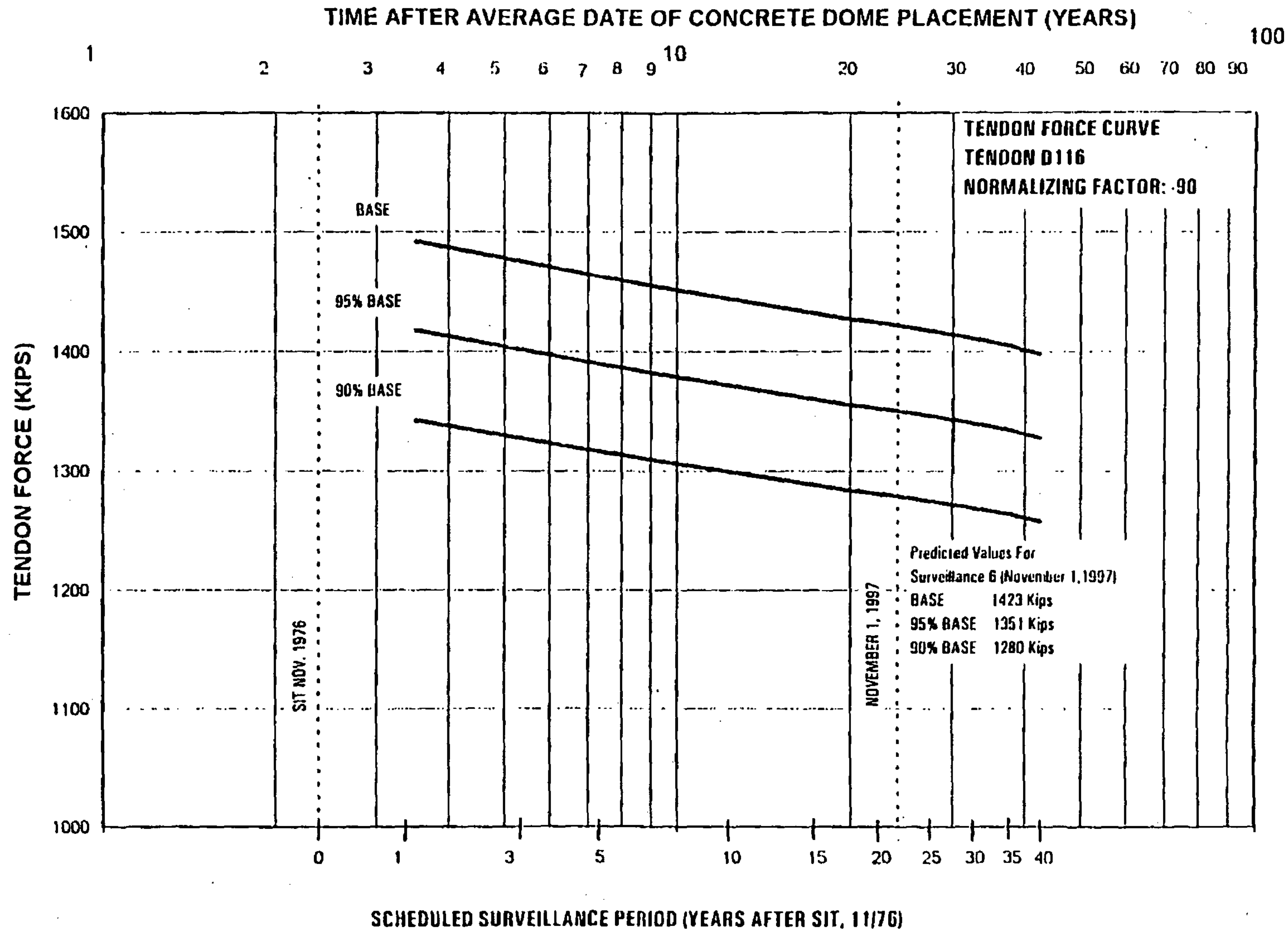
NOTE: These curves were generated accounting for prestress losses.

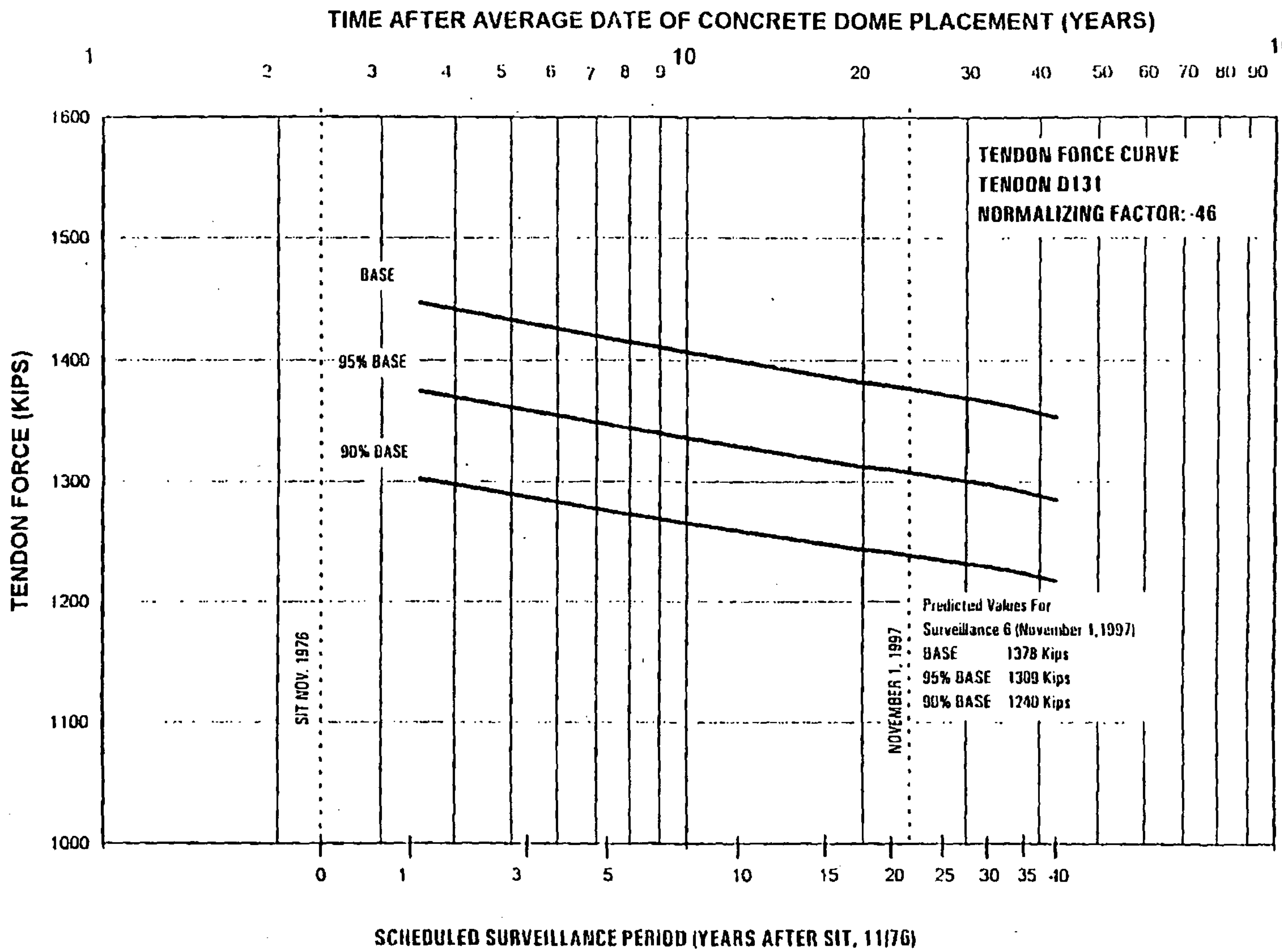

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE (KIPS)
1600
1500
1400
1300
1200
1100
1000
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
TENDON FORCE CURVE
TENDON D112
NORMALIZING FACTOR: -138
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1472 Kips
95% BASE 1398 Kips
90% BASE 1325 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

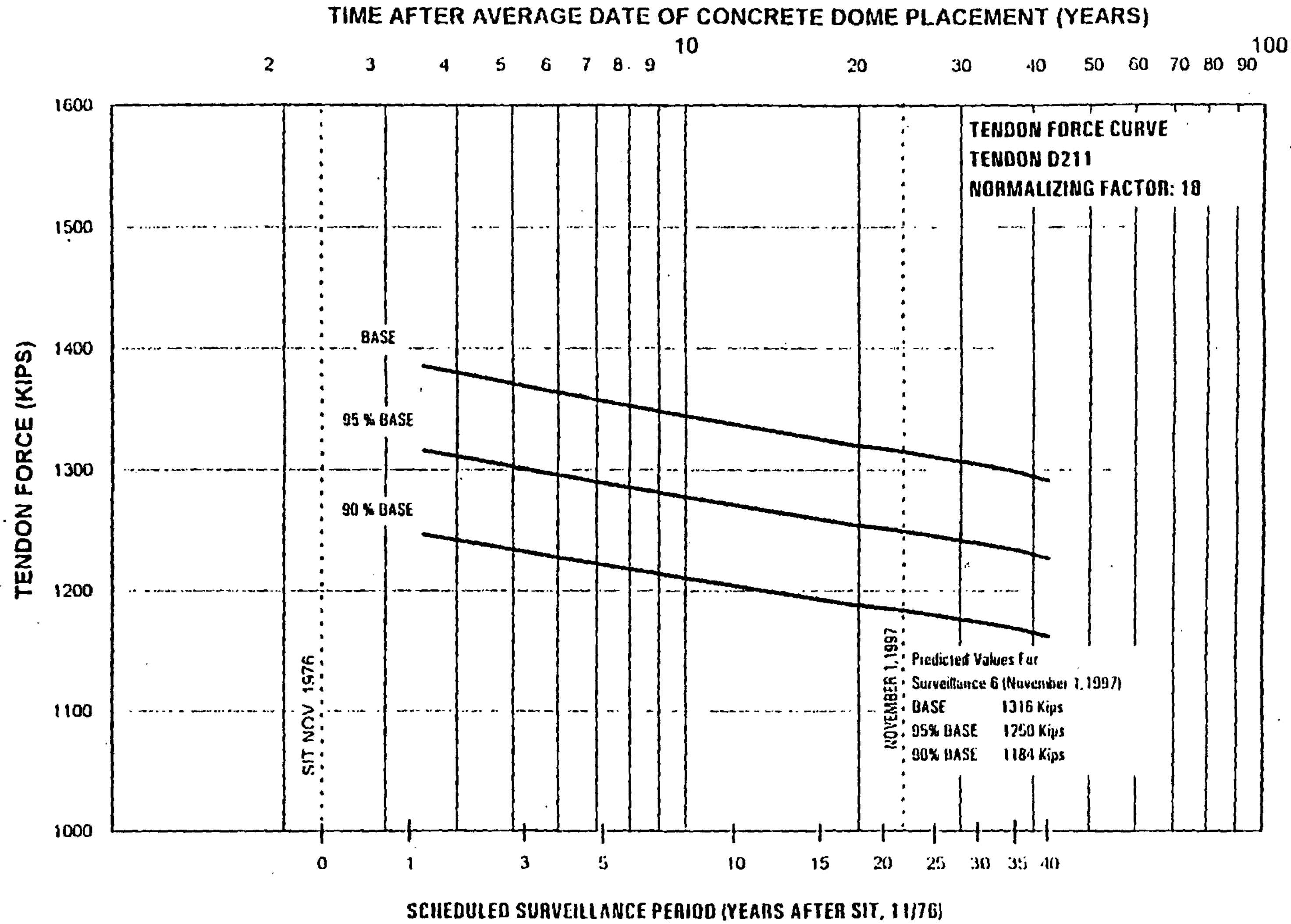

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON D113
NORMALIZING FACTOR: -35
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1,1997
Predicted Values For
Surveillance 6 (November 1,1997)
BASE 1368 Kips
95% BASE 1300 Kips
90% BASE 1231 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

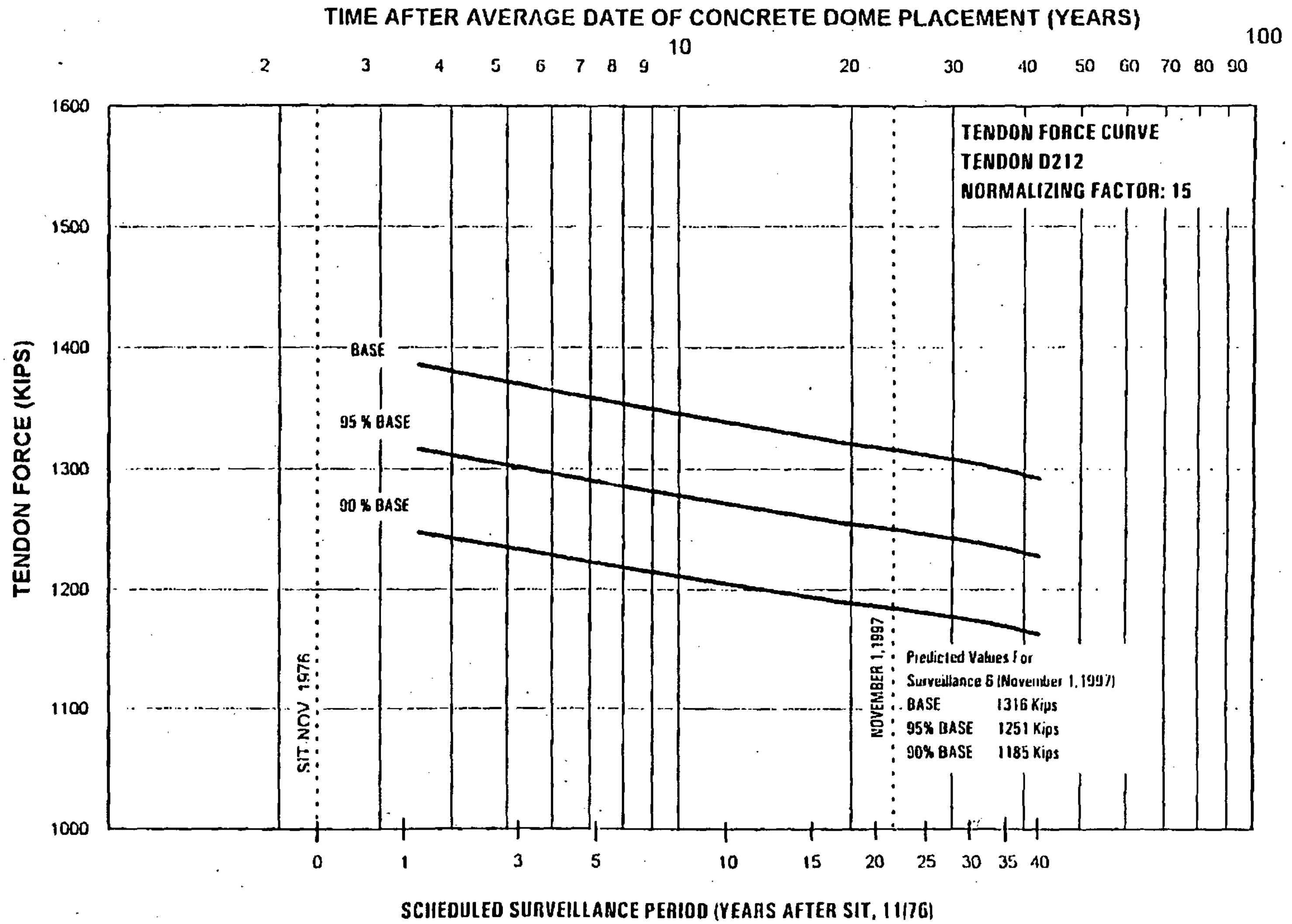

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
TENDON FORCE (KIPS)
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
TENDON FORCE CURVE
TENDON D114
NORMALIZING FACTOR: -132
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1465 Kips
95% BASE 1392 Kips
90% BASE 1319 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

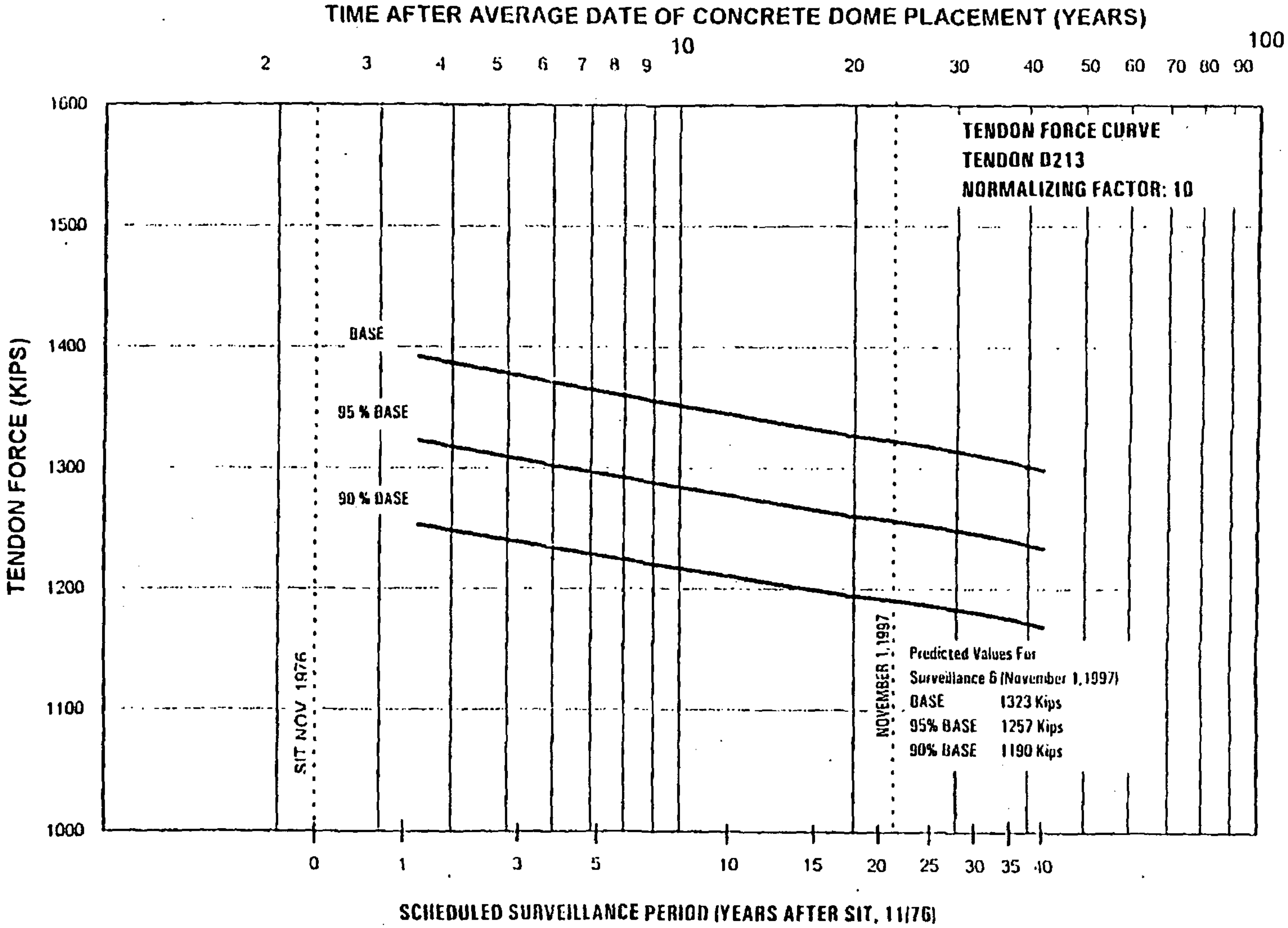

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON D115
NORMALIZING FACTOR: -12
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1346 Kips
95% BASE 1279 Kips
90% BASE 1212 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

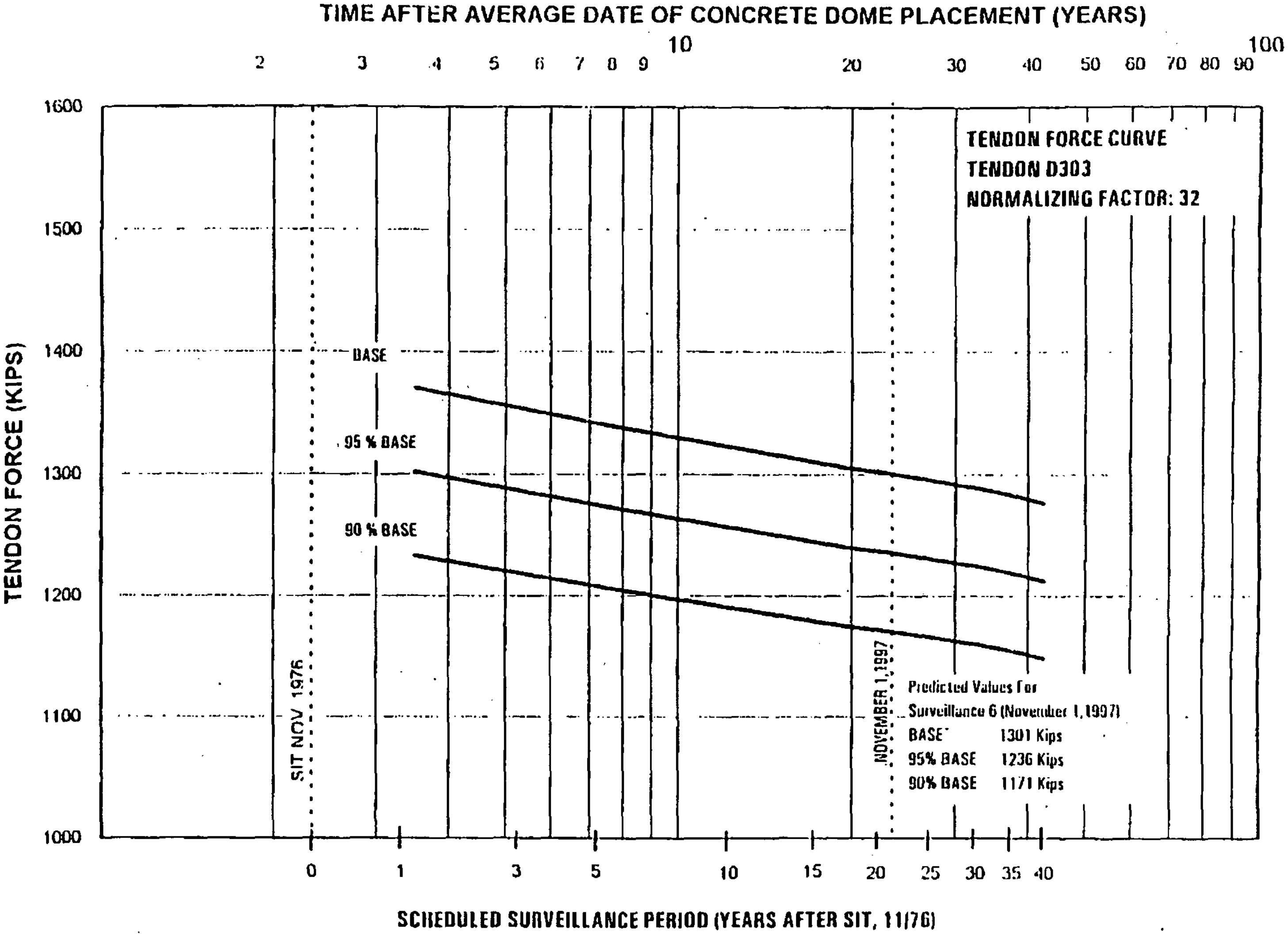

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON D116
NORMALIZING FACTOR: .90
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1423 Kips
95% BASE 1351 Kips
90% BASE 1280 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

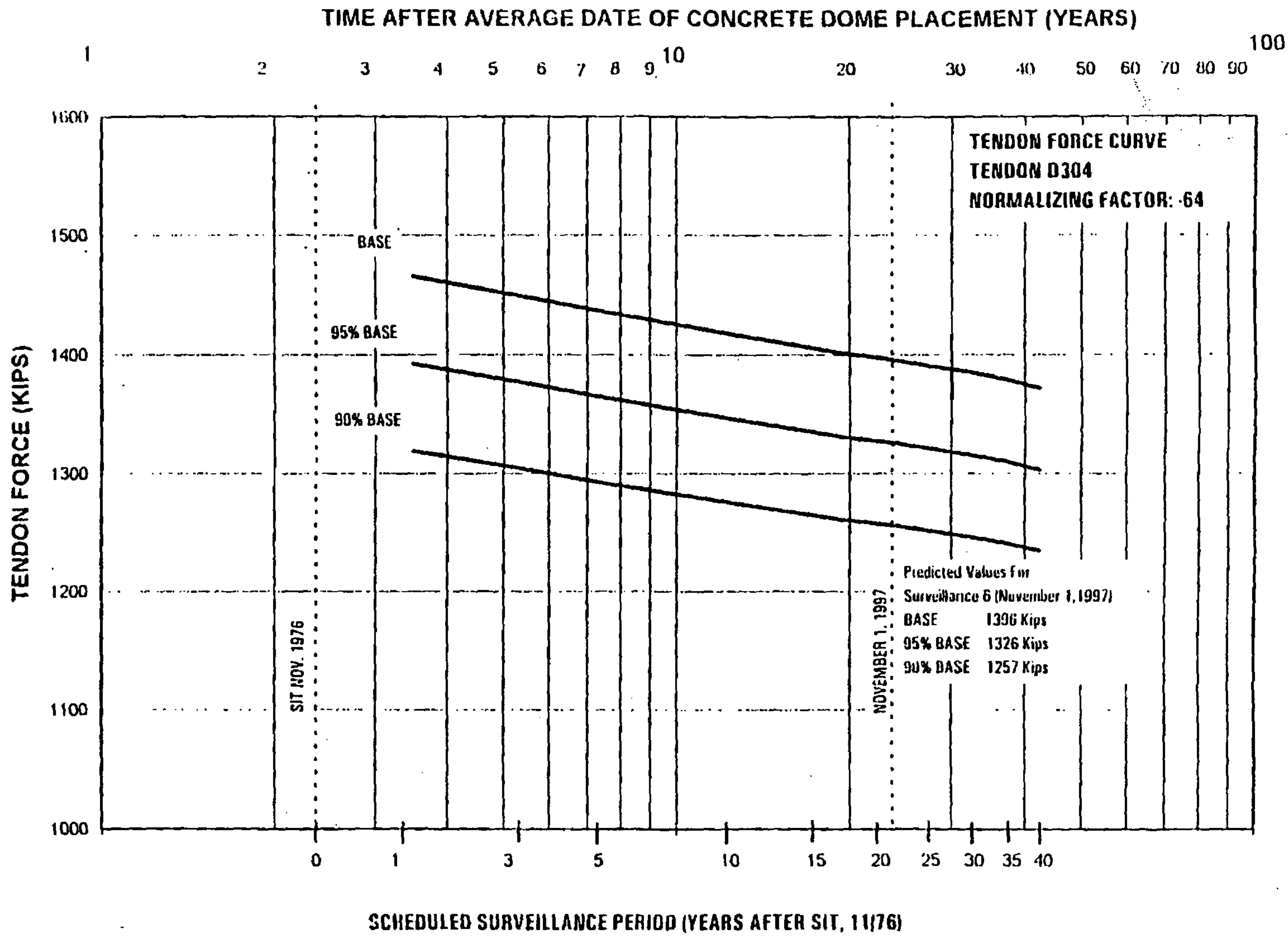

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON D131
NORMALIZING FACTOR: -46
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1378 Kips
95% BASE 1309 Kips
90% BASE 1240 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

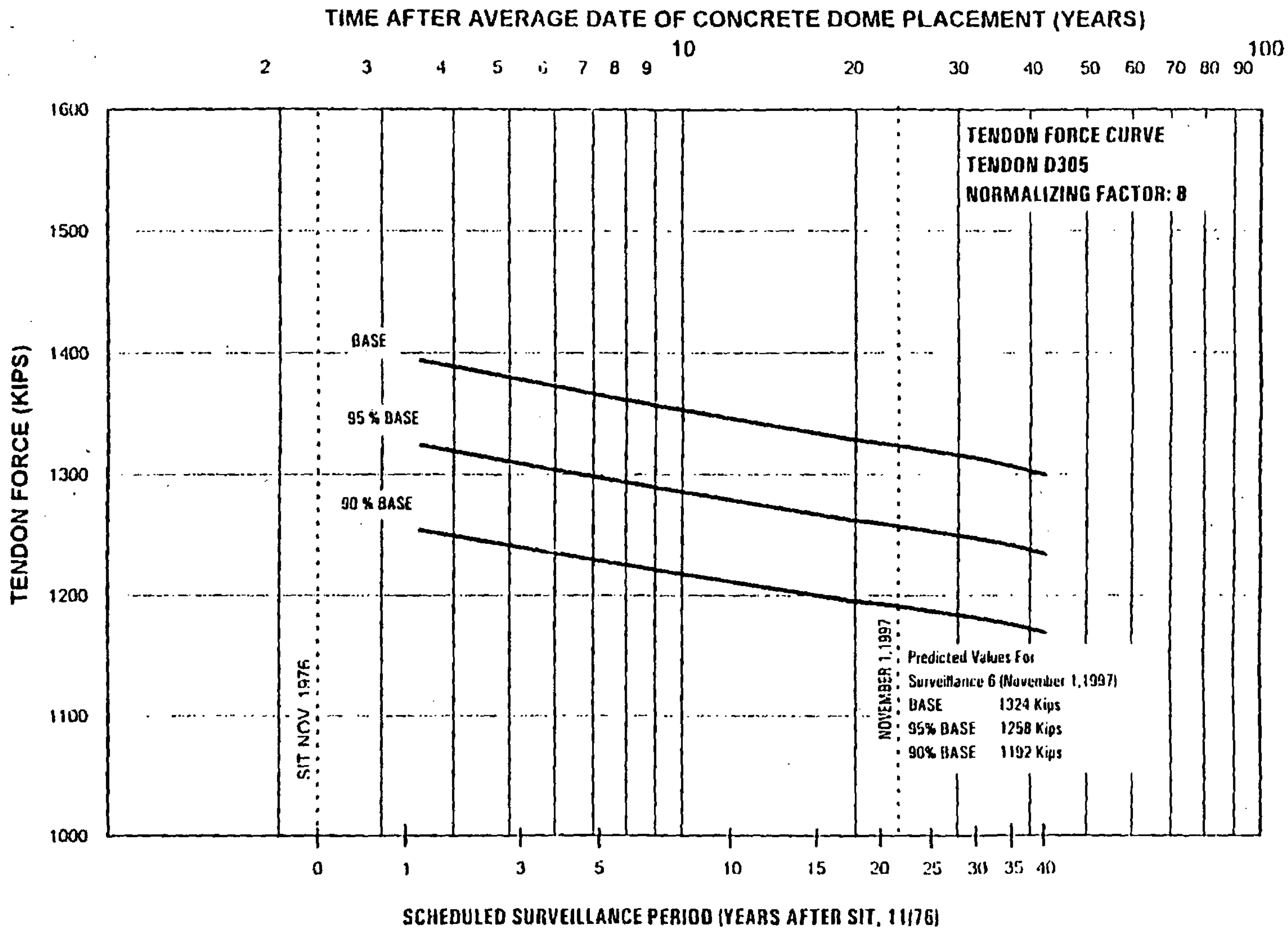

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE (KIPS)
1000 1100 1200 1300 1400 1500 1600
TENDON FORCE CURVE
TENDON D211
NORMALIZING FACTOR: 18
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1316 Kips
95% BASE 1250 Kips
90% BASE 1184 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

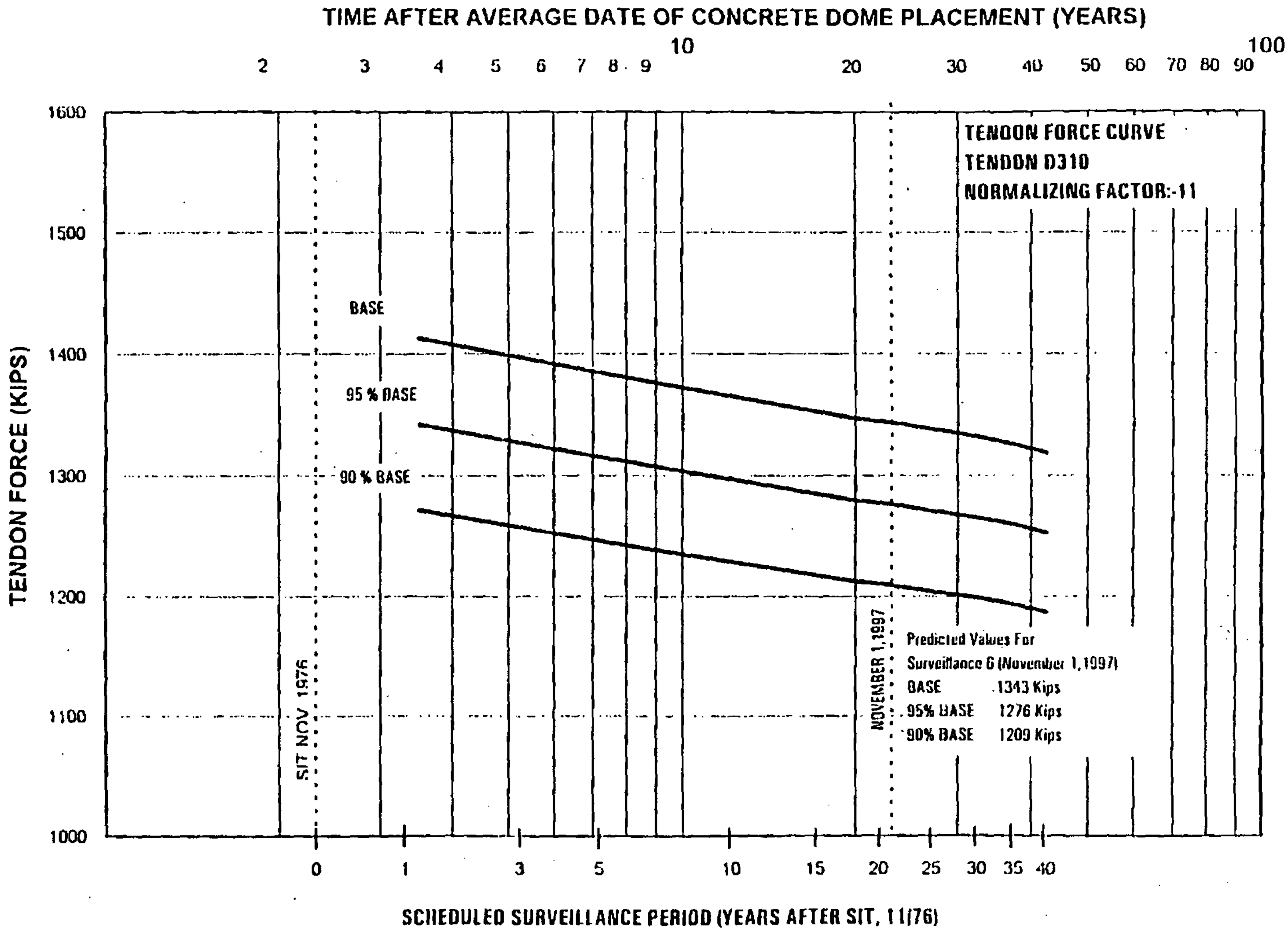

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
TENDON FORCE CURVE
TENDON D212
NORMALIZING FACTOR: 15
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1316 Kips
95% BASE 1251 Kips
90% BASE 1185 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

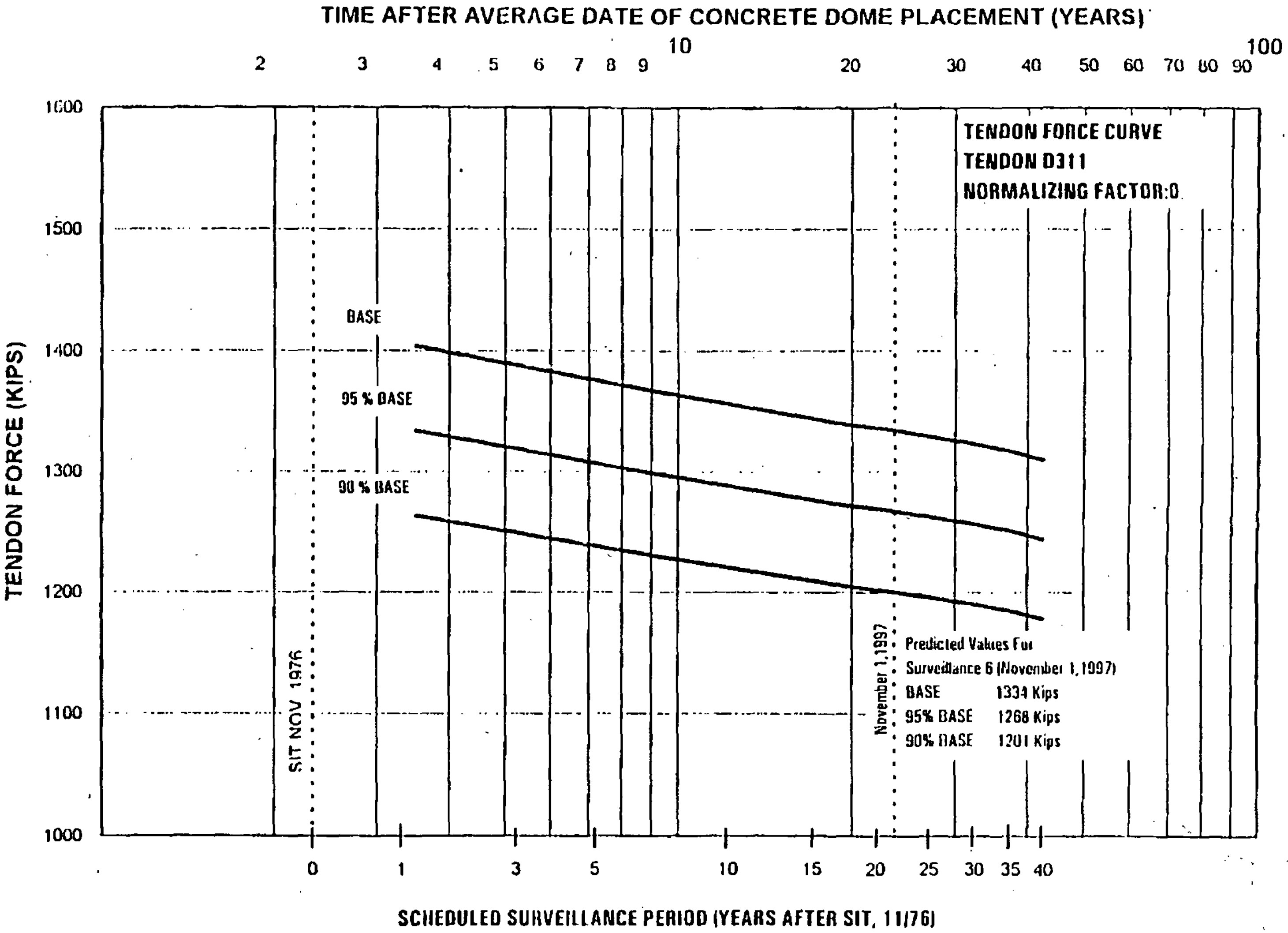

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON D213
NORMALIZING FACTOR: 10
TENDON FORCE (KIPS)
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1323 Kips
95% BASE 1257 Kips
90% BASE 1190 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

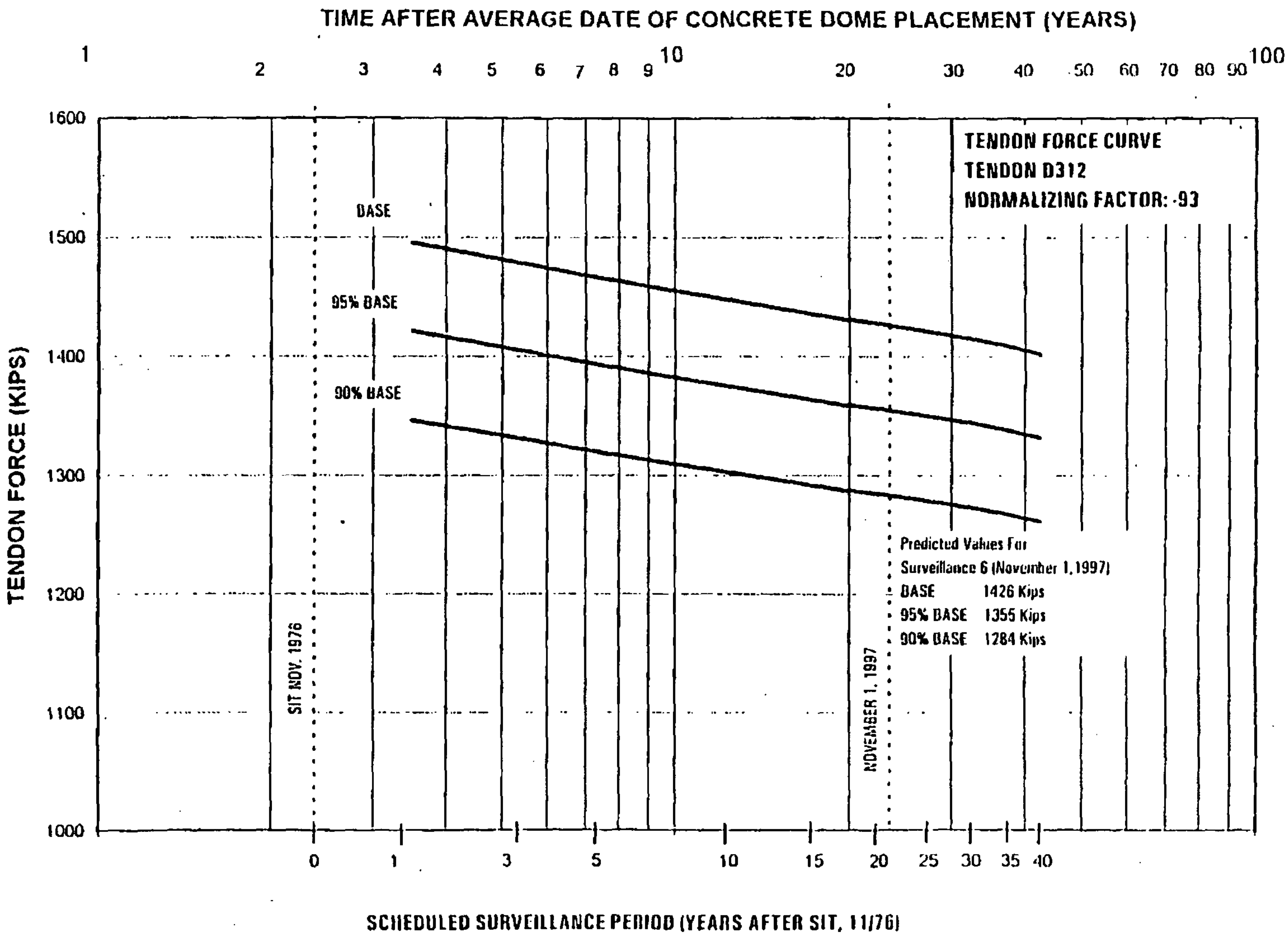

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON D303
NORMALIZING FACTOR: 32
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1,1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1301 Kips
95% BASE 1236 Kips
90% BASE 1171 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

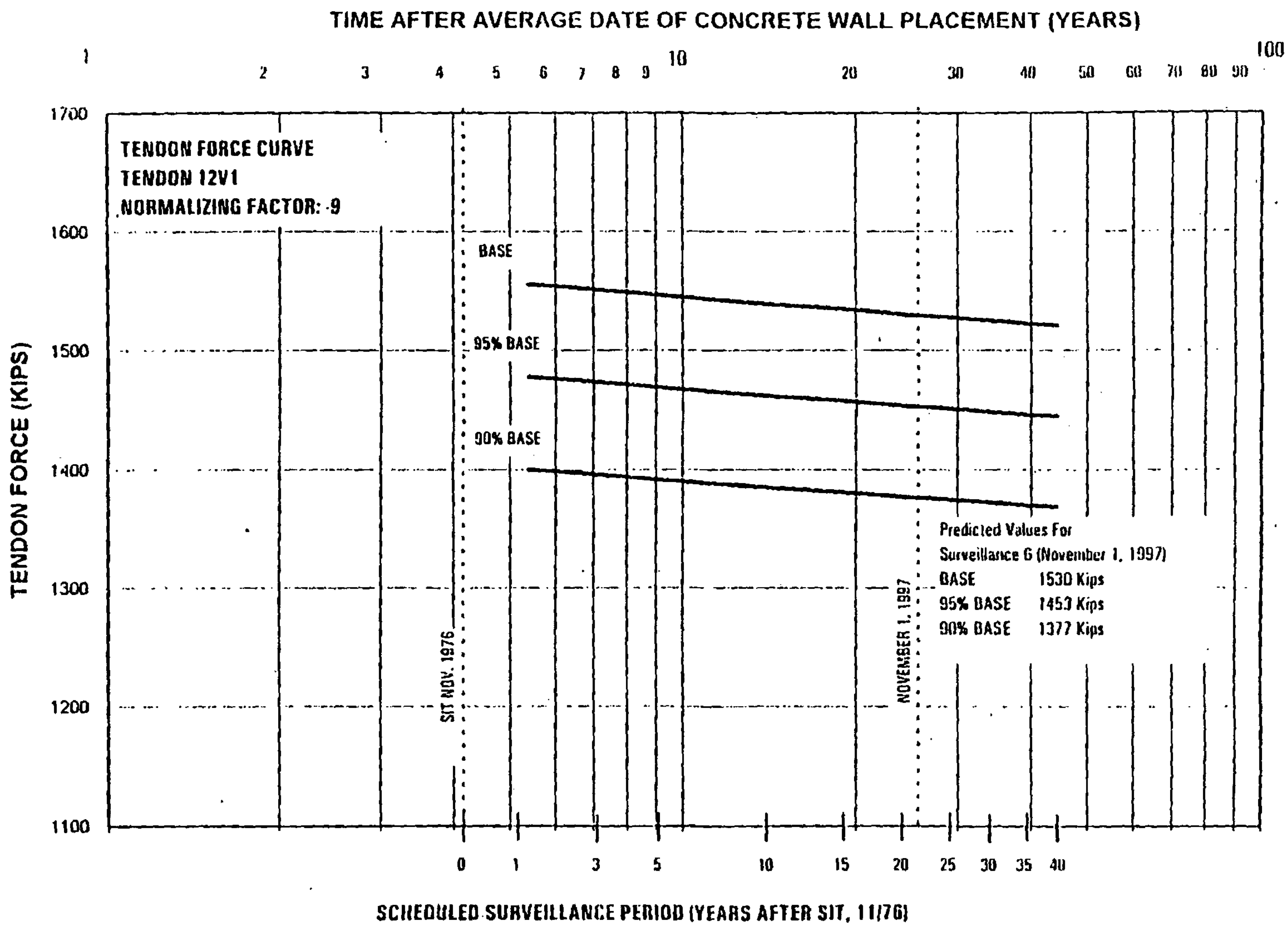

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON D304
NORMALIZING FACTOR: .64
1600
1500
1400
1300
1200
1100
1000
TENDON FORCE (KIPS)
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1396 Kips
95% BASE 1326 Kips
90% BASE 1257 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

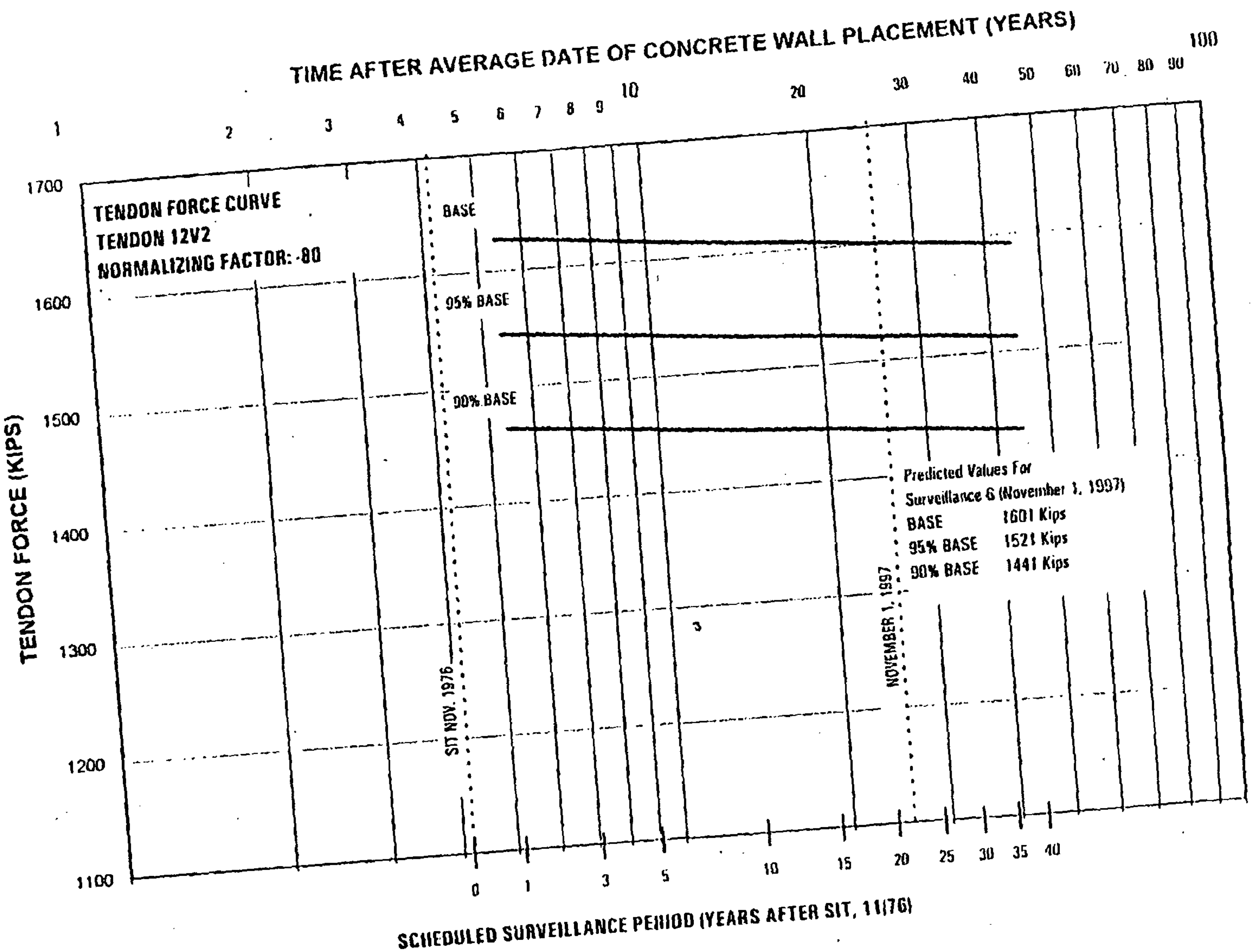

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON D305
NORMALIZING FACTOR: 8
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1324 Kips
95% BASE 1258 Kips
90% BASE 1192 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

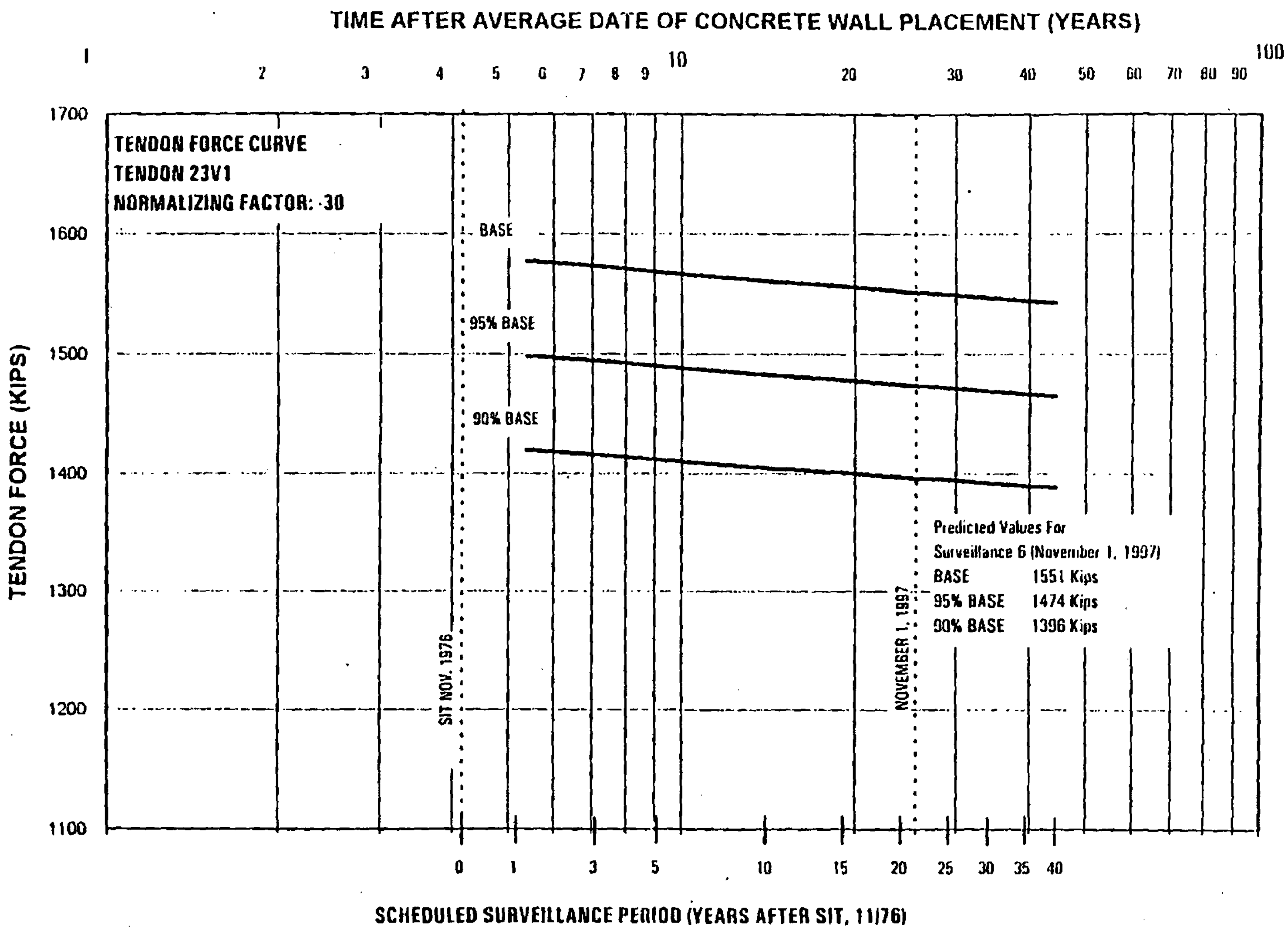

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON D310
NORMALIZING FACTOR:-11
BASE
95 % BASE
90 % BASE
SIT NOV 1976
NOVEMBER 1,1997
Predicted Values For
Surveillance 6 (November 1,1997)
BASE 1343 Kips
95% BASE 1276 Kips
90% BASE 1209 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

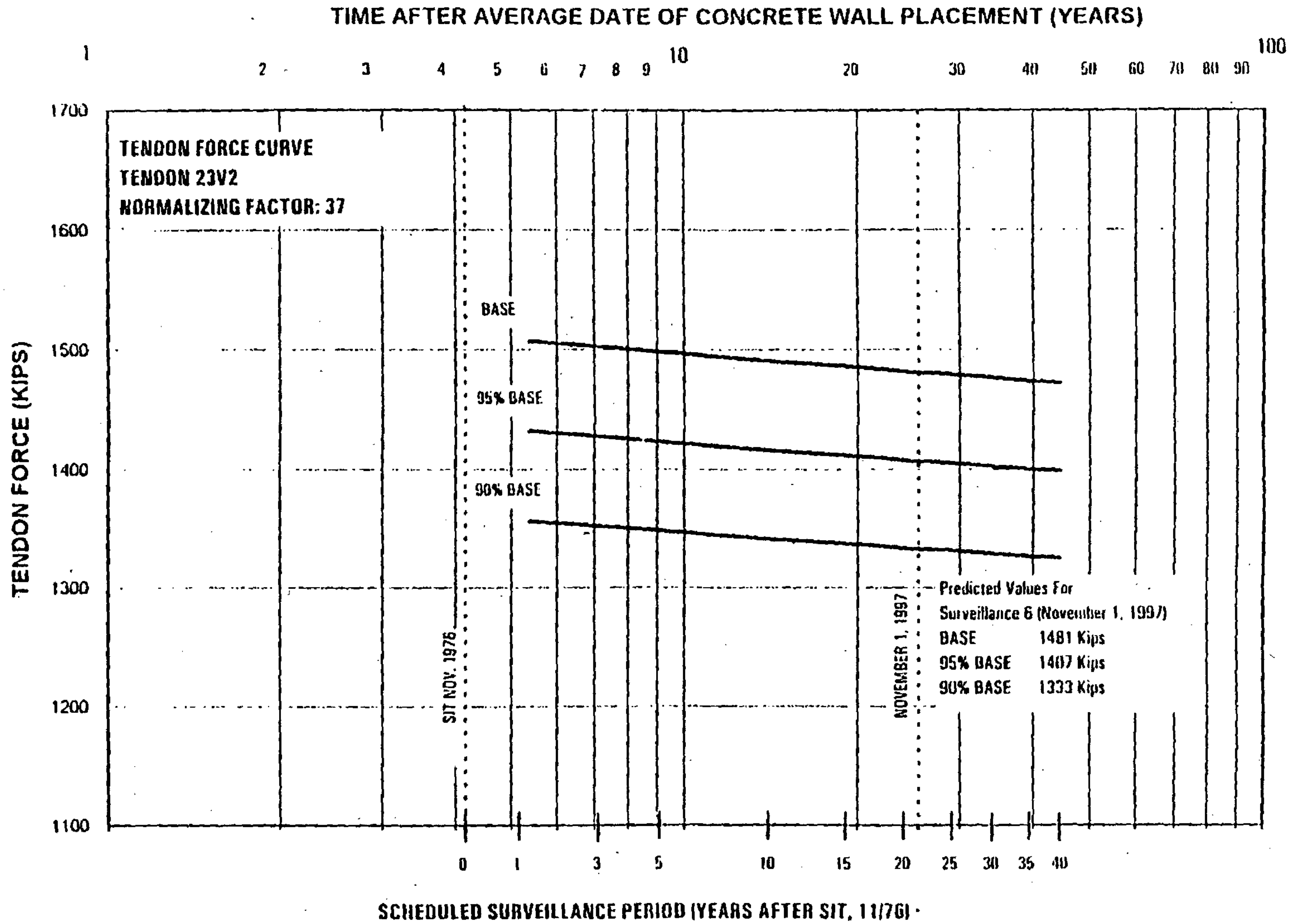

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON D311
NORMALIZING FACTOR:0
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
BASE
95 % BASE
90 % BASE
SIT NOV 1976
November 1,1997
Predicted Values For
Surveillance 6 (November 1,1997)
BASE 1334 Kips
95% BASE 1268 Kips
90% BASE 1201 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

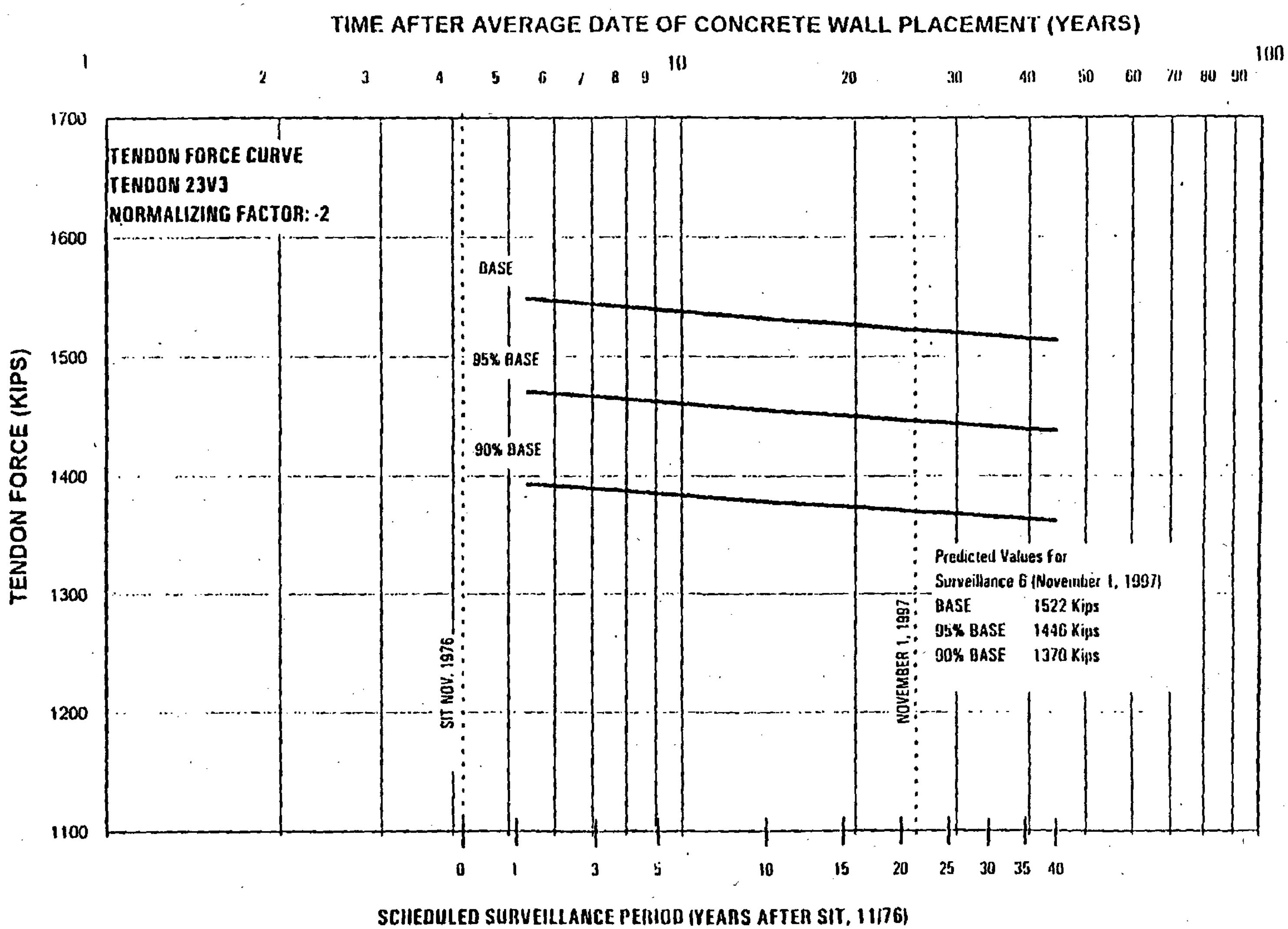

TIME AFTER AVERAGE DATE OF CONCRETE DOME PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
TENDON FORCE CURVE
TENDON D312
NORMALIZING FACTOR: -93
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1426 Kips
95% BASE 1355 Kips
90% BASE 1284 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

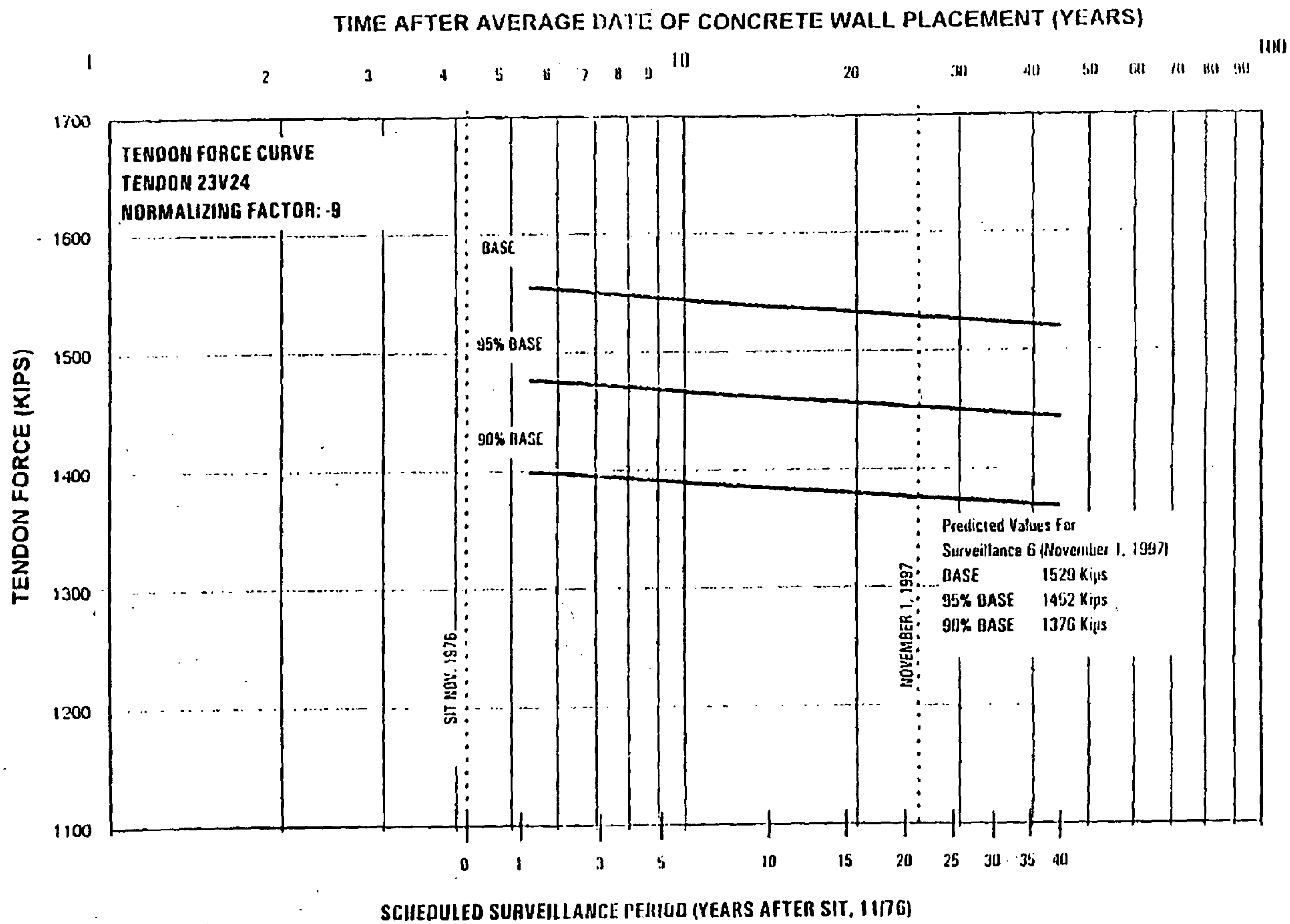

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 12V1
NORMALIZING FACTOR: -9
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1530 Kips
95% BASE 1453 Kips
90% BASE 1377 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

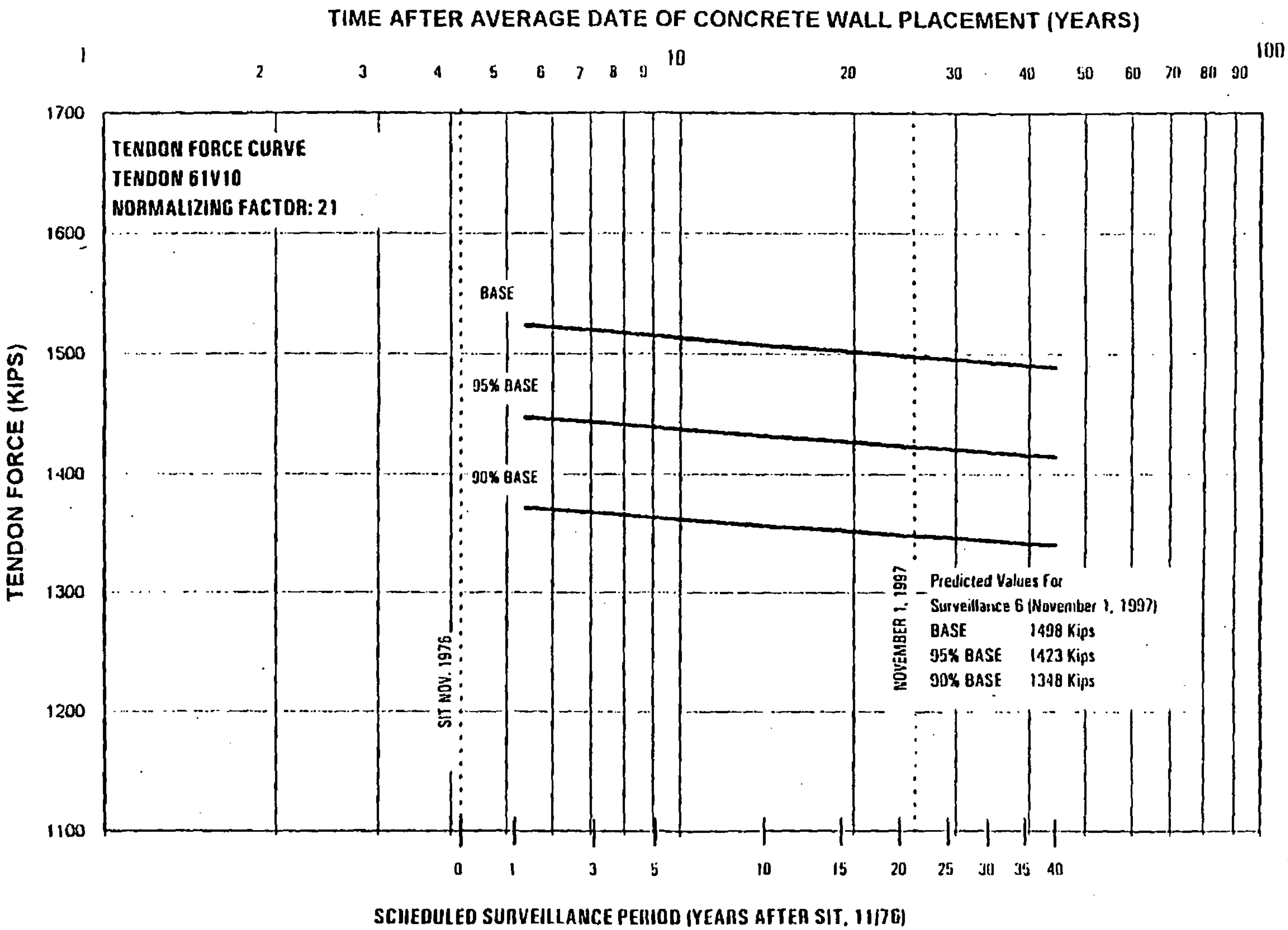

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 12V2
NORMALIZING FACTOR: -80
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1601 Kips
95% BASE 1521 Kips
90% BASE 1441 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

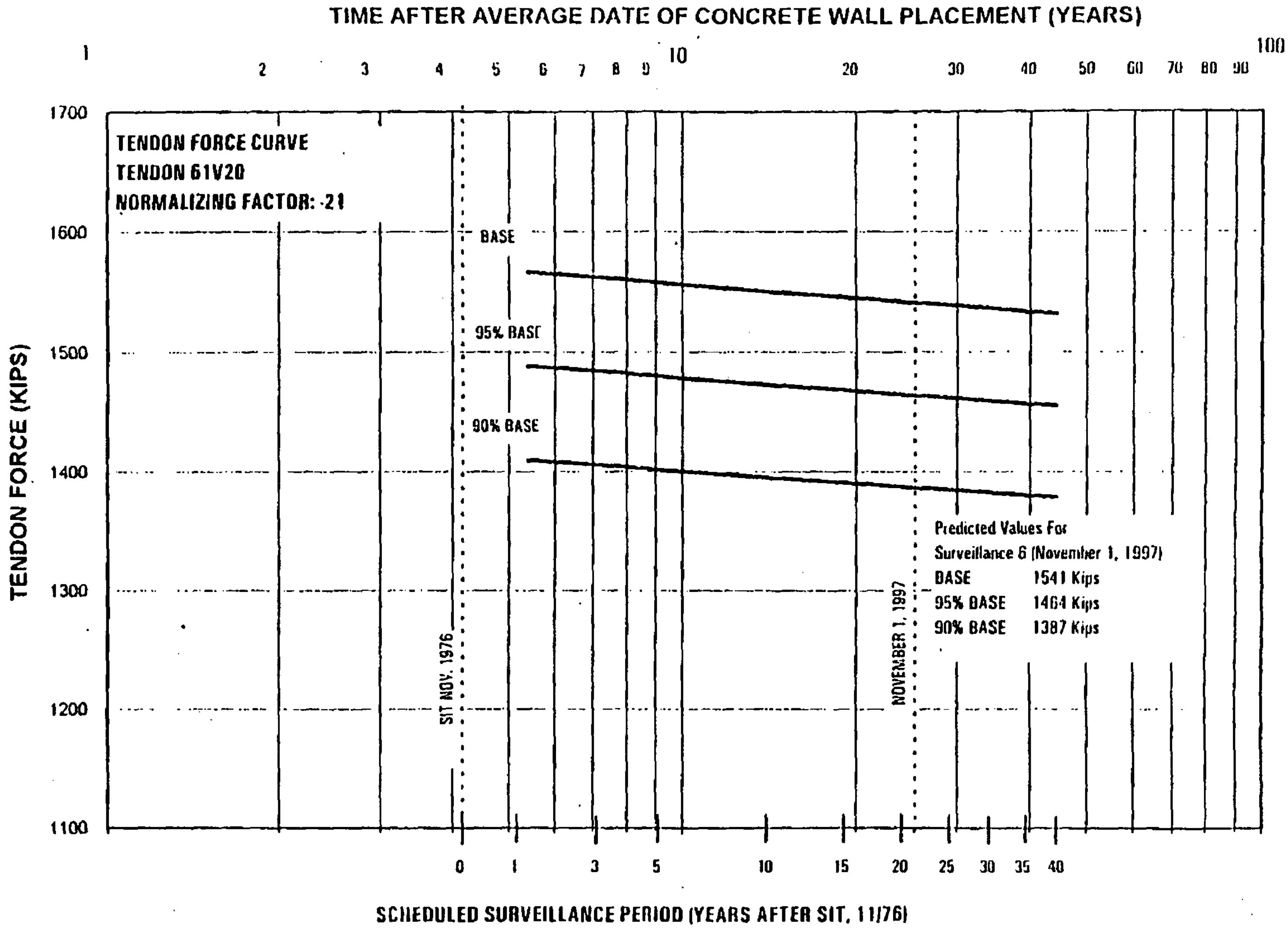

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 23V1
NORMALIZING FACTOR: ·30
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1551 Kips
95% BASE 1474 Kips
90% BASE 1396 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

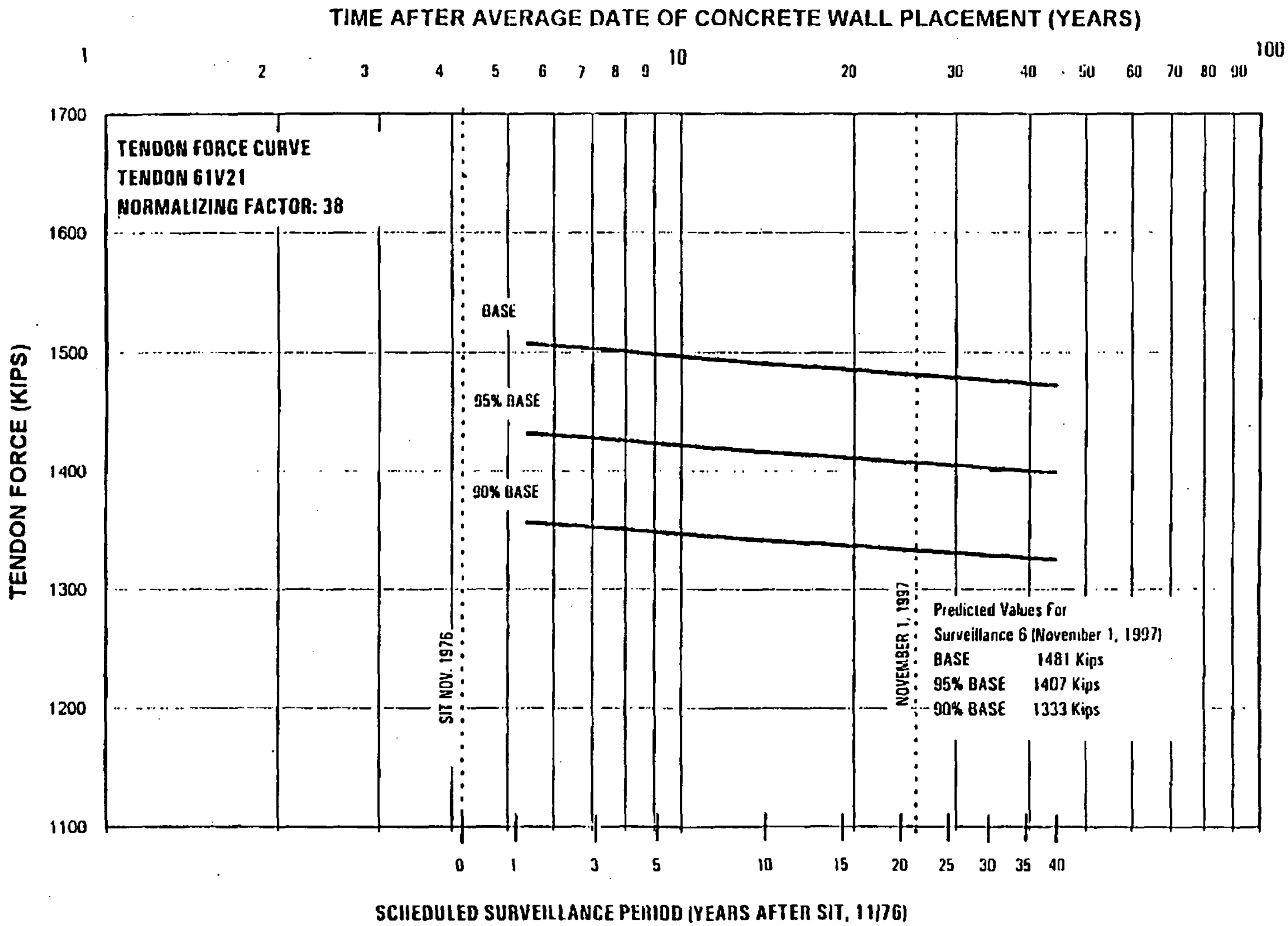

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 23V2
NORMALIZING FACTOR: 37
TENDON FORCE (KIPS)
1700 1600 1500 1400 1300 1200 1100
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1481 Kips
95% BASE 1407 Kips
90% BASE 1333 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

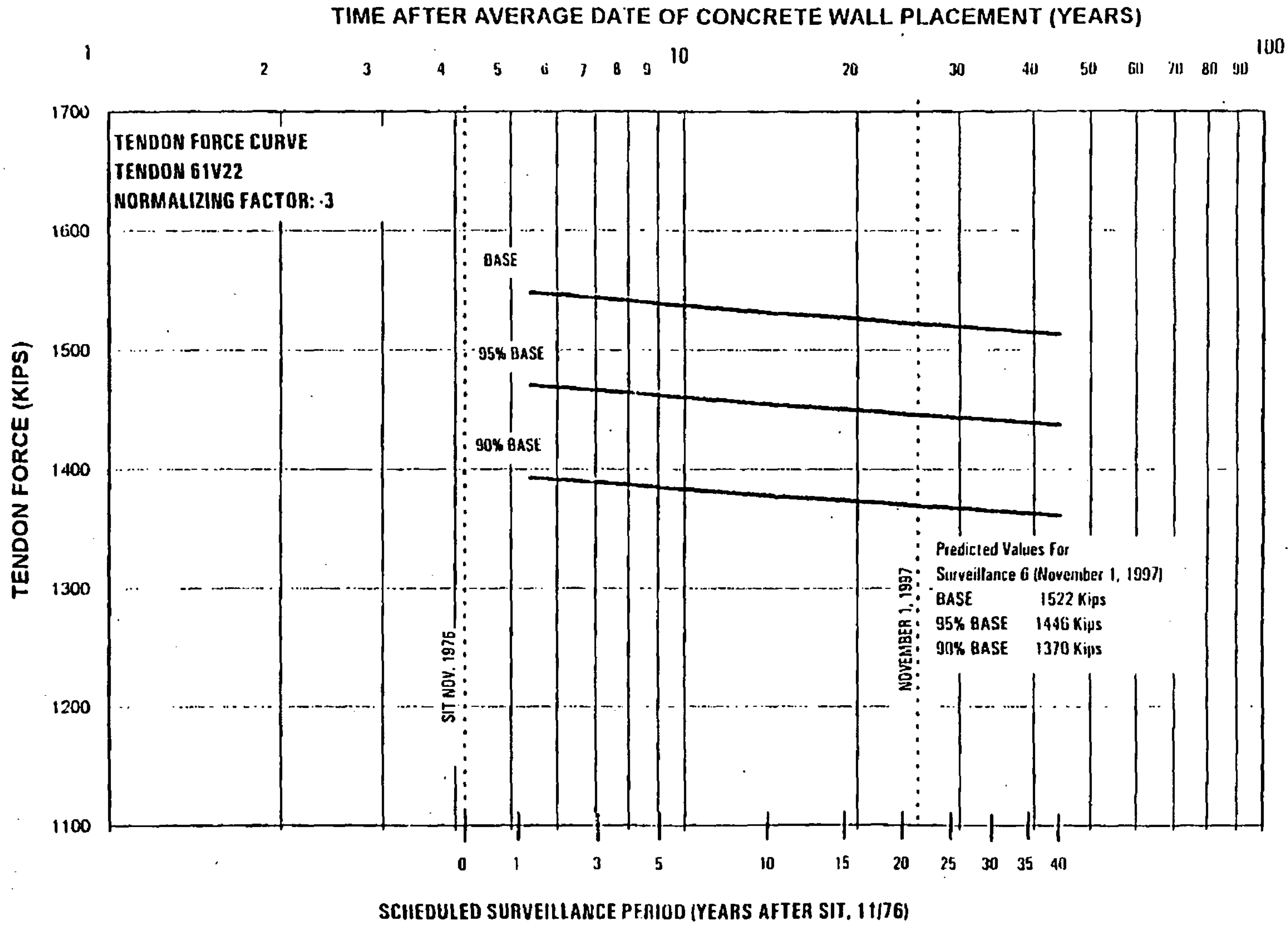

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 23V3
NORMALIZING FACTOR: -2
TENDON FORCE (KIPS)
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1522 Kips
95% BASE 1446 Kips
90% BASE 1370 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

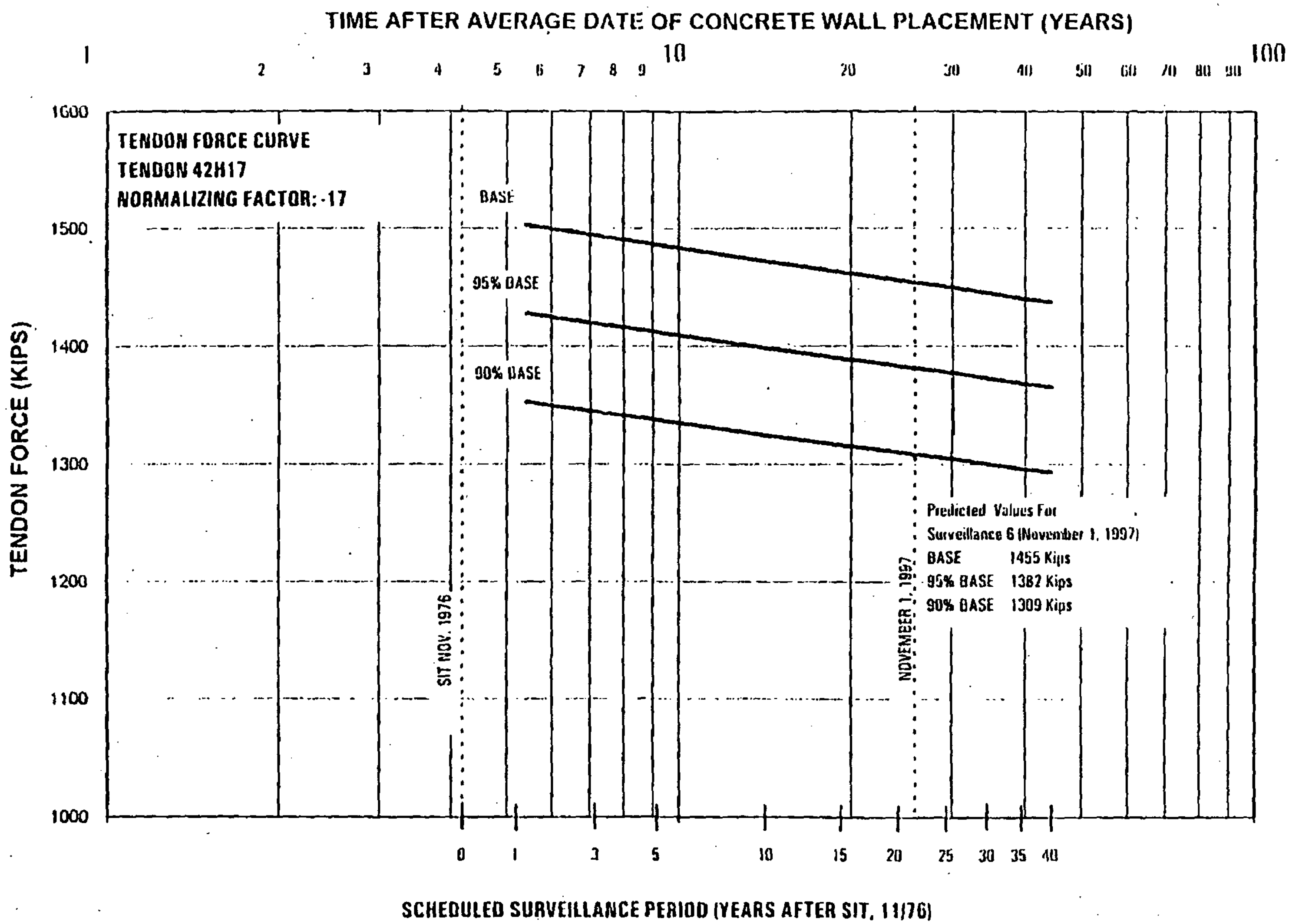

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 23V24
NORMALIZING FACTOR: -9
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1529 Kips
95% BASE 1452 Kips
90% BASE 1376 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

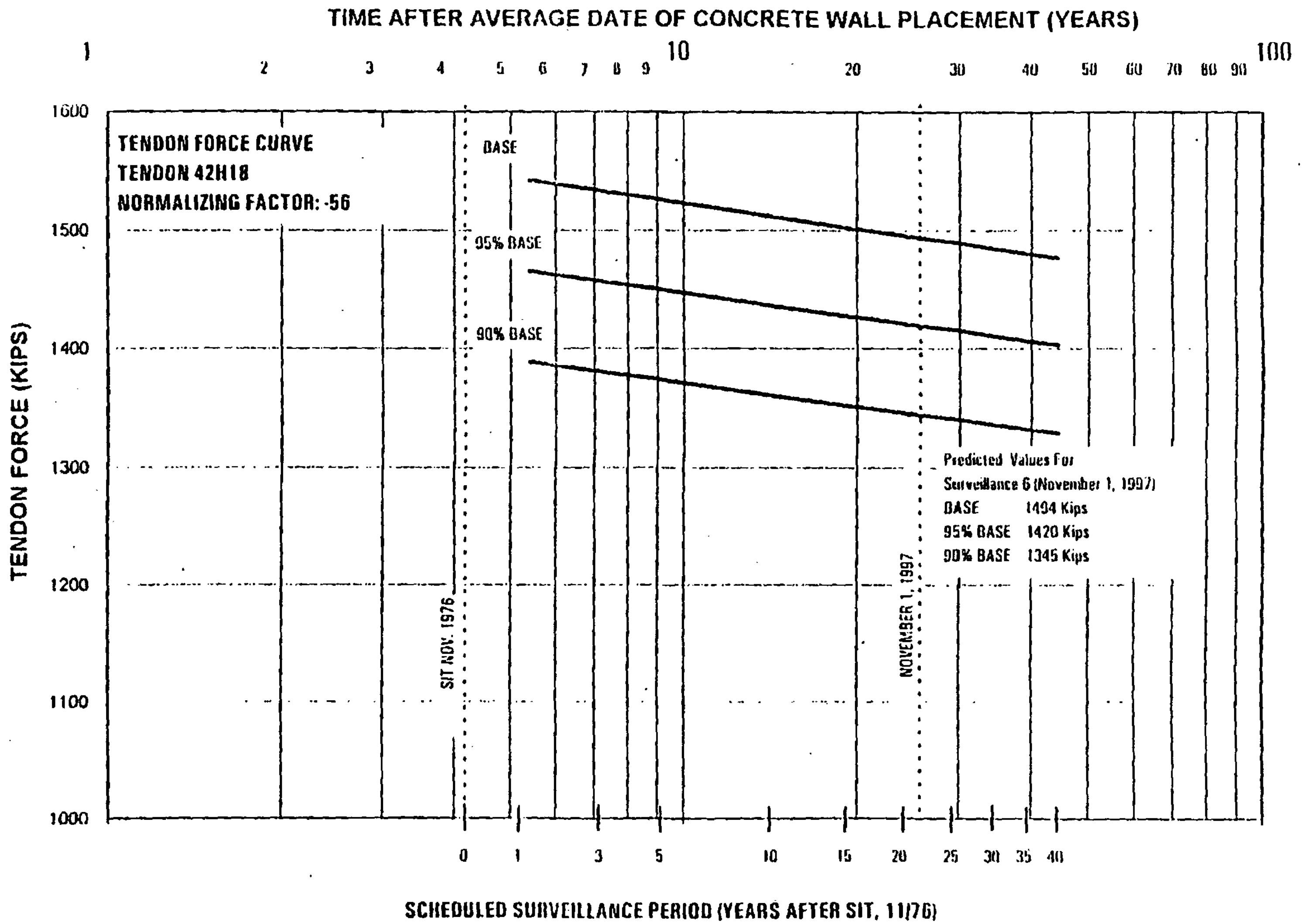

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE (KIPS)
1700 1600 1500 1400 1300 1200 1100
TENDON FORCE CURVE
TENDON 61V10
NORMALIZING FACTOR: 21
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1498 Kips
95% BASE 1423 Kips
90% BASE 1348 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

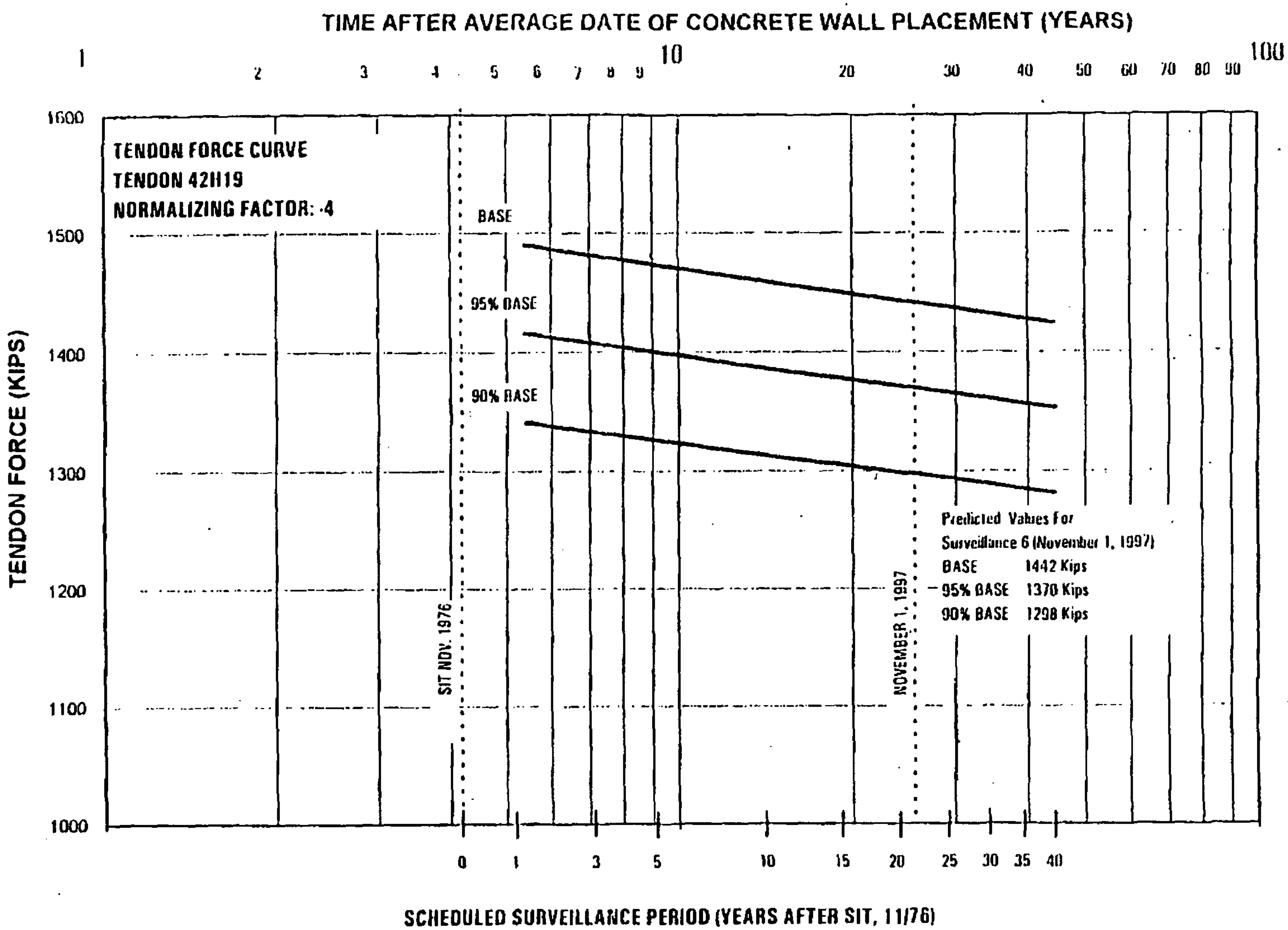

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 61V20
NORMALIZING FACTOR: -21
TENDON FORCE (KIPS)
1700 1600 1500 1400 1300 1200 1100
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1541 Kips
95% BASE 1464 Kips
90% BASE 1387 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

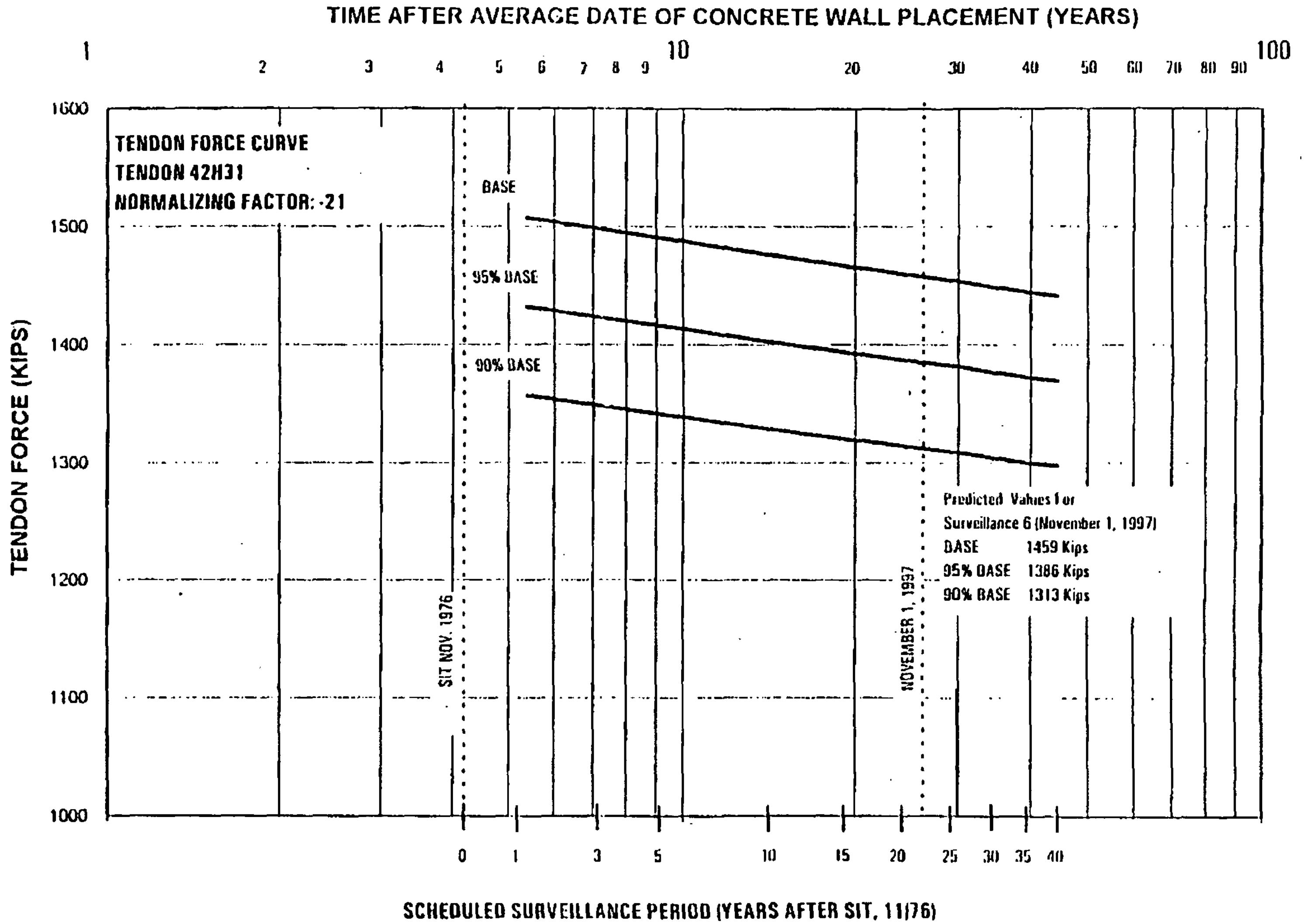

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 61V21
NORMALIZING FACTOR: 38
1700
1600
1500
1400
1300
1200
1100
TENDON FORCE (KIPS)
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1481 Kips
95% BASE 1407 Kips
90% BASE 1333 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

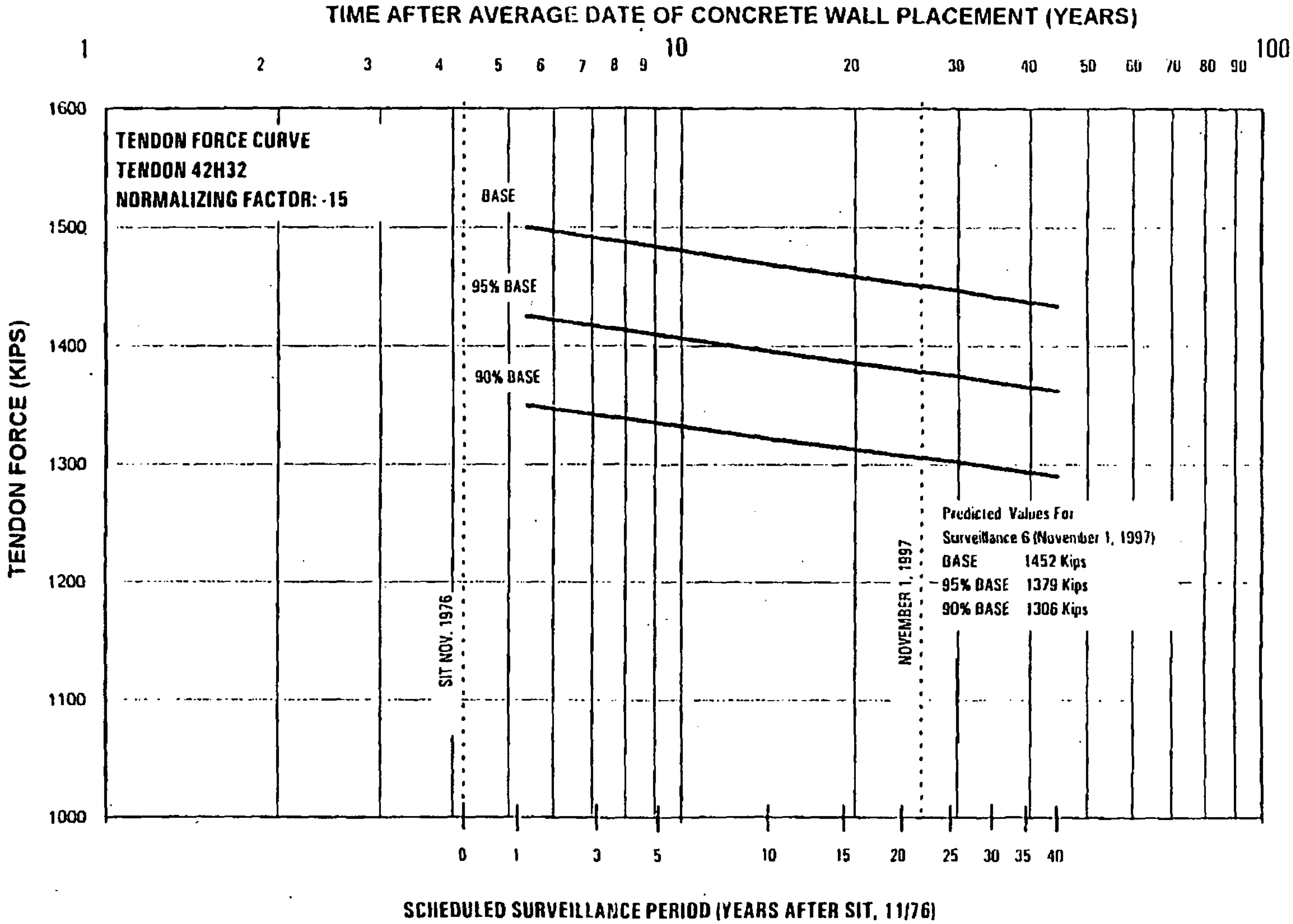

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 61V22
NORMALIZING FACTOR: -3
TENDON FORCE (KIPS)
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1522 Kips
95% BASE 1446 Kips
90% BASE 1370 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

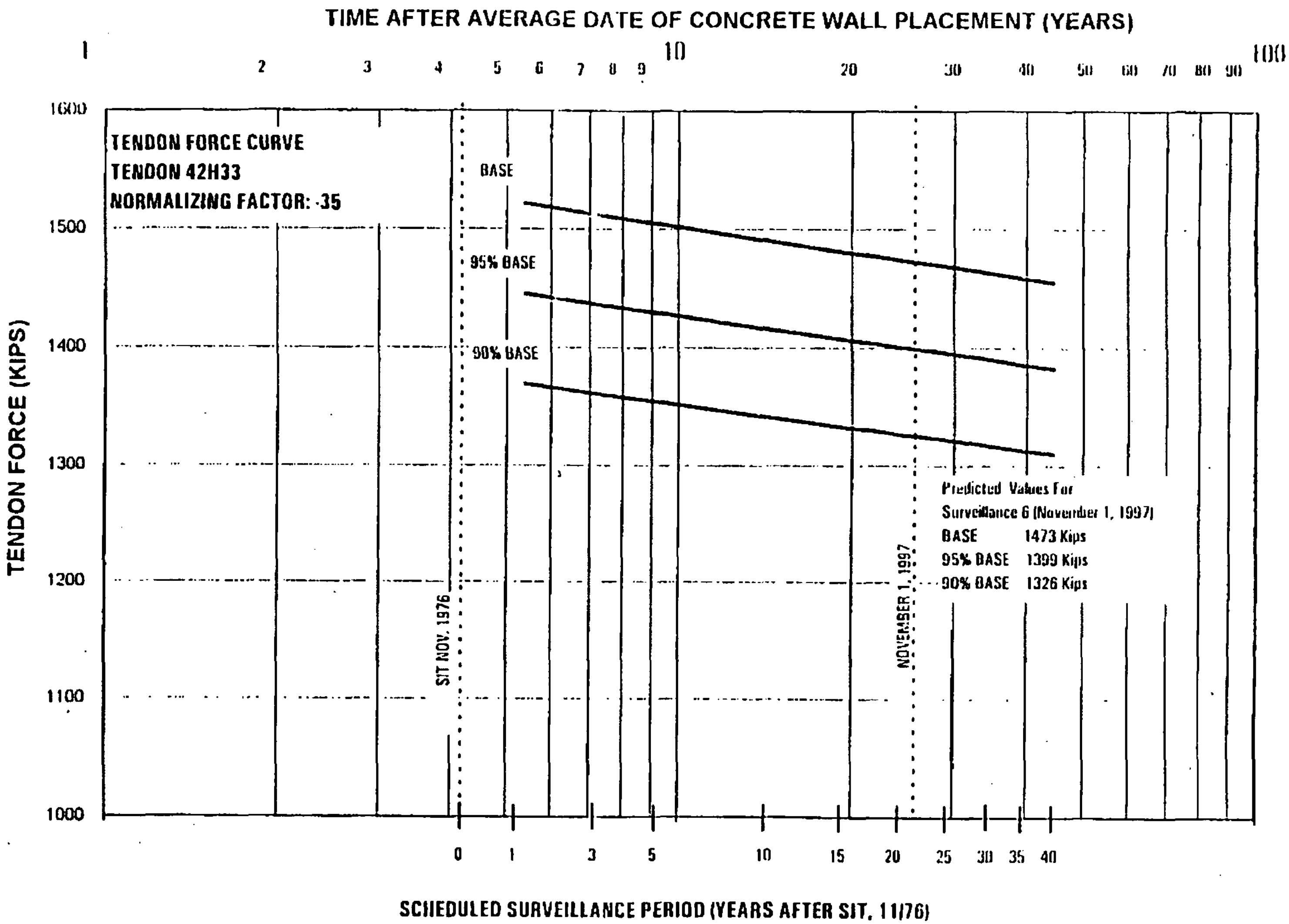

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 42H17
NORMALIZING FACTOR: -17
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1455 Kips
95% BASE 1382 Kips
90% BASE 1309 Kips
TENDON FORCE (KIPS)
1000
1100
1200
1300
1400
1500
1600
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

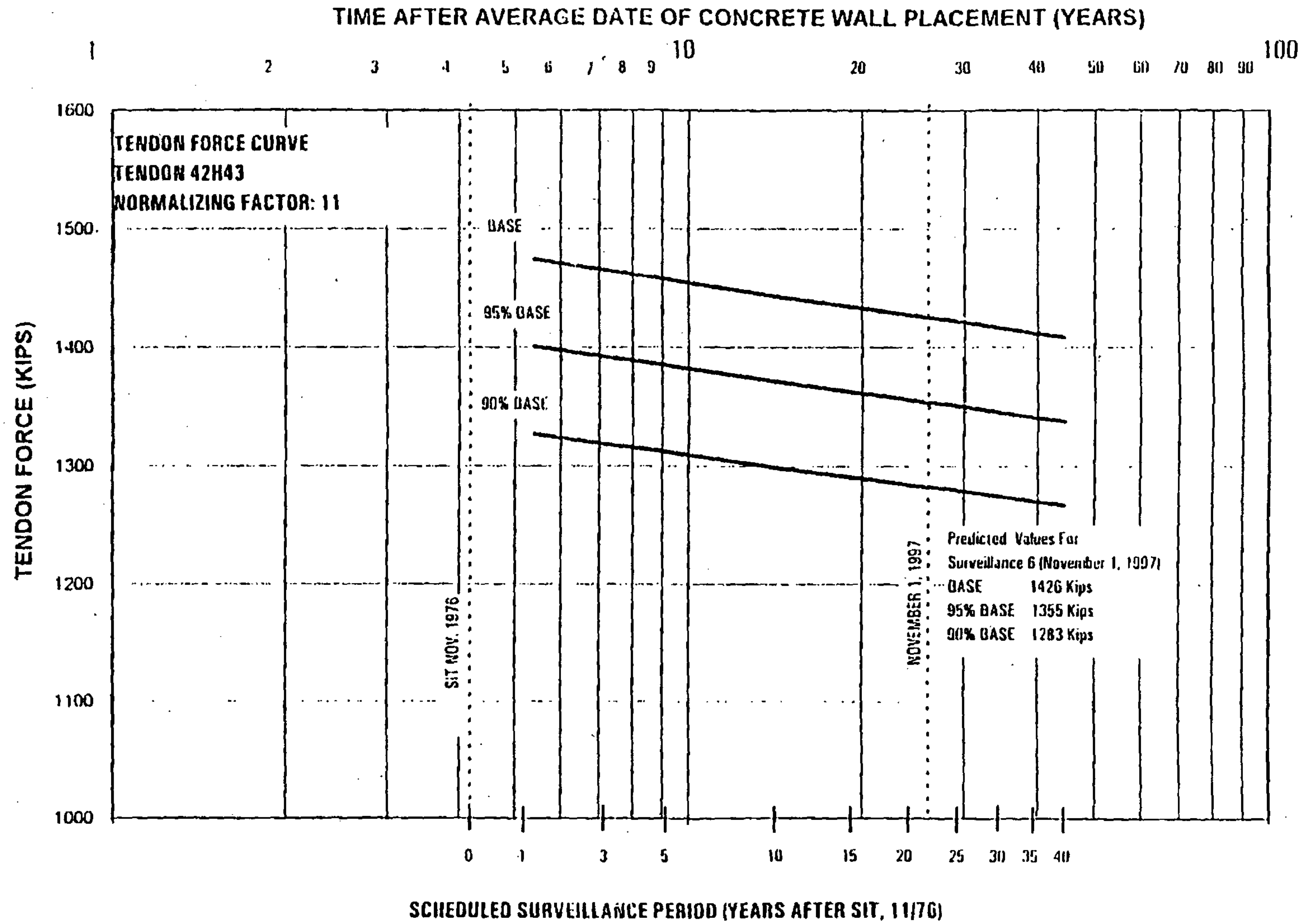

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 42H18
NORMALIZING FACTOR: -56
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1494 Kips
95% BASE 1420 Kips
90% BASE 1345 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

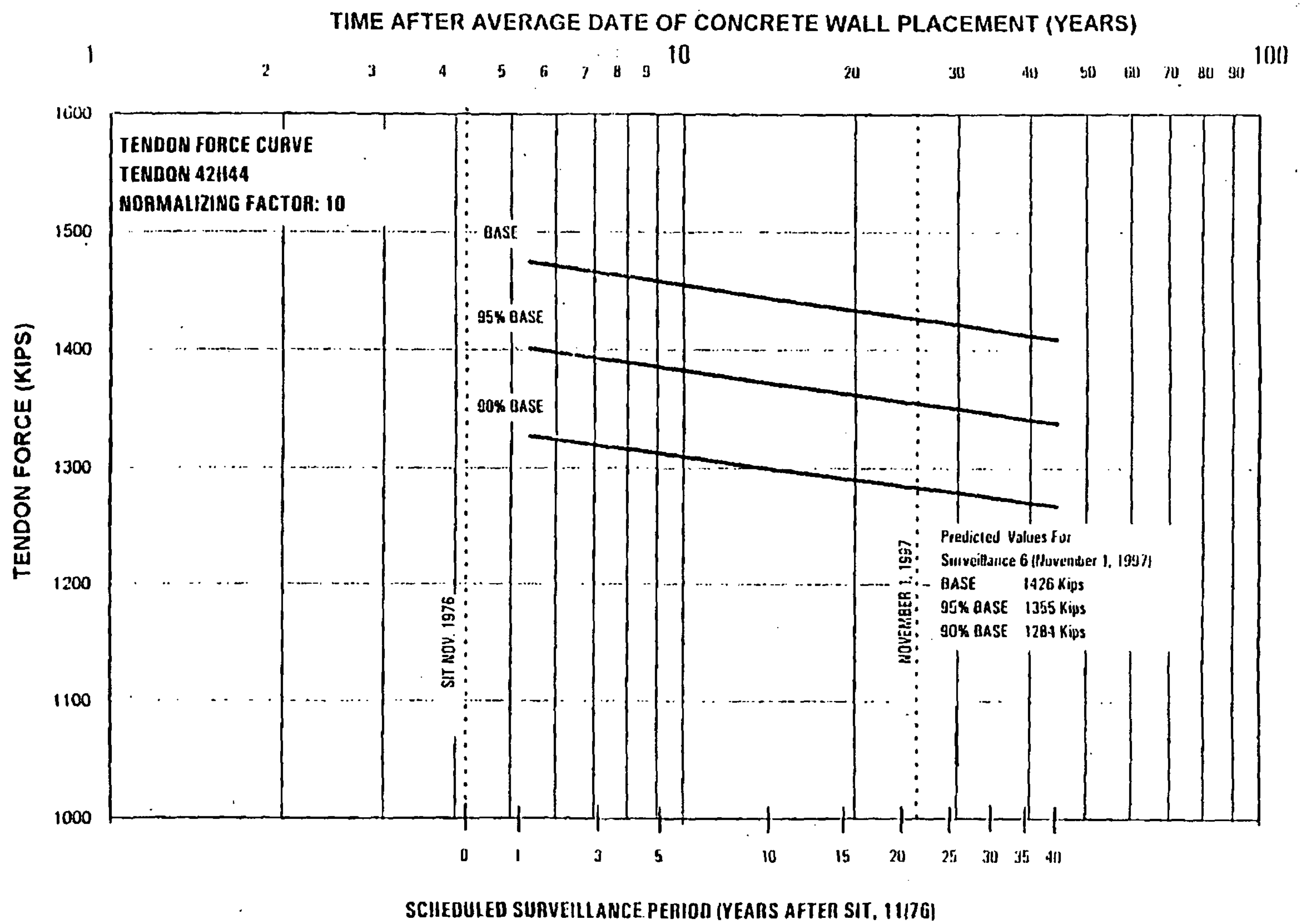

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 42H19
NORMALIZING FACTOR: 4
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1442 Kips
95% BASE 1370 Kips
90% BASE 1298 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

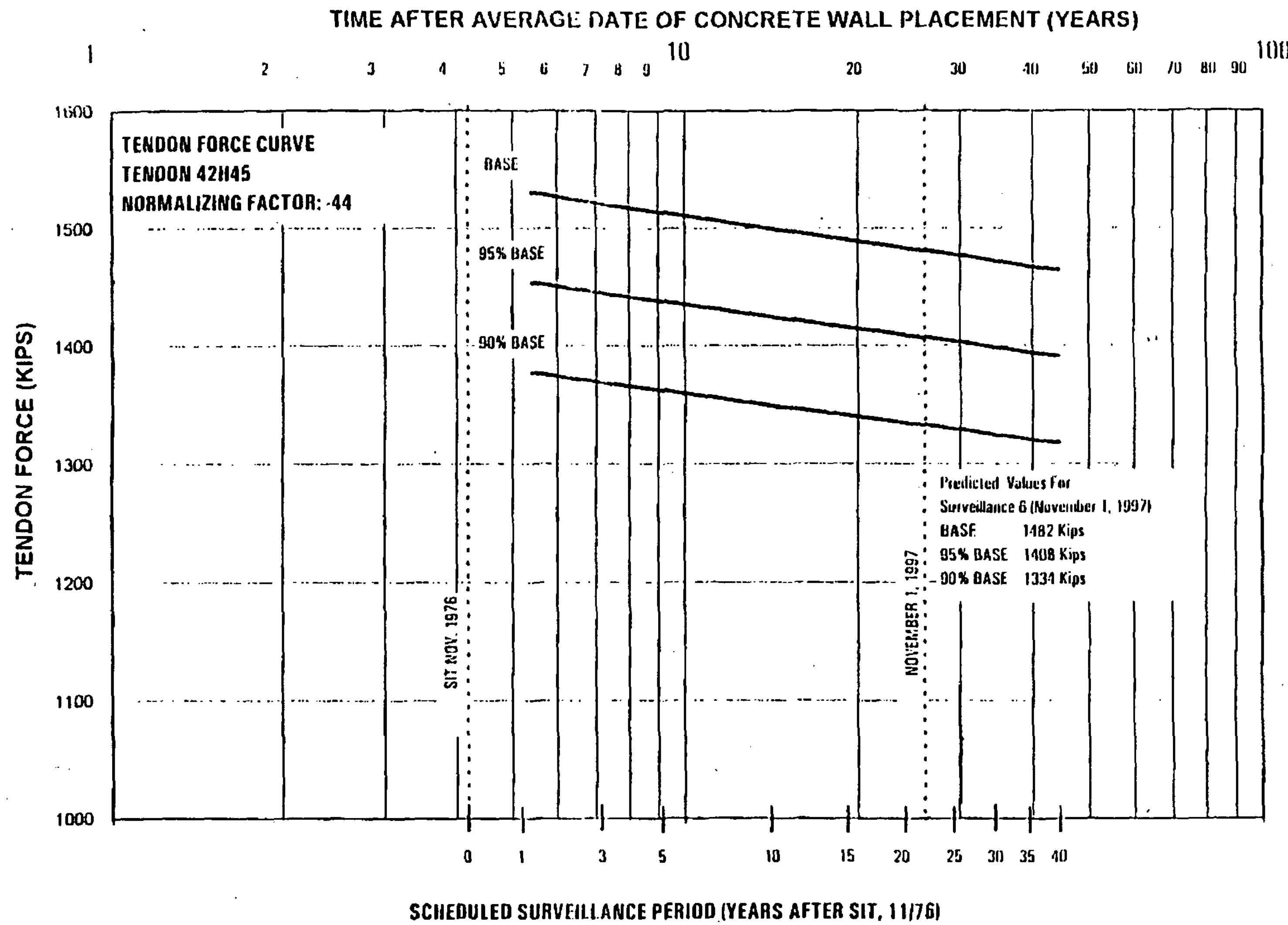

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 42H31
NORMALIZING FACTOR: -21
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1459 Kips
95% BASE 1386 Kips
90% BASE 1313 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

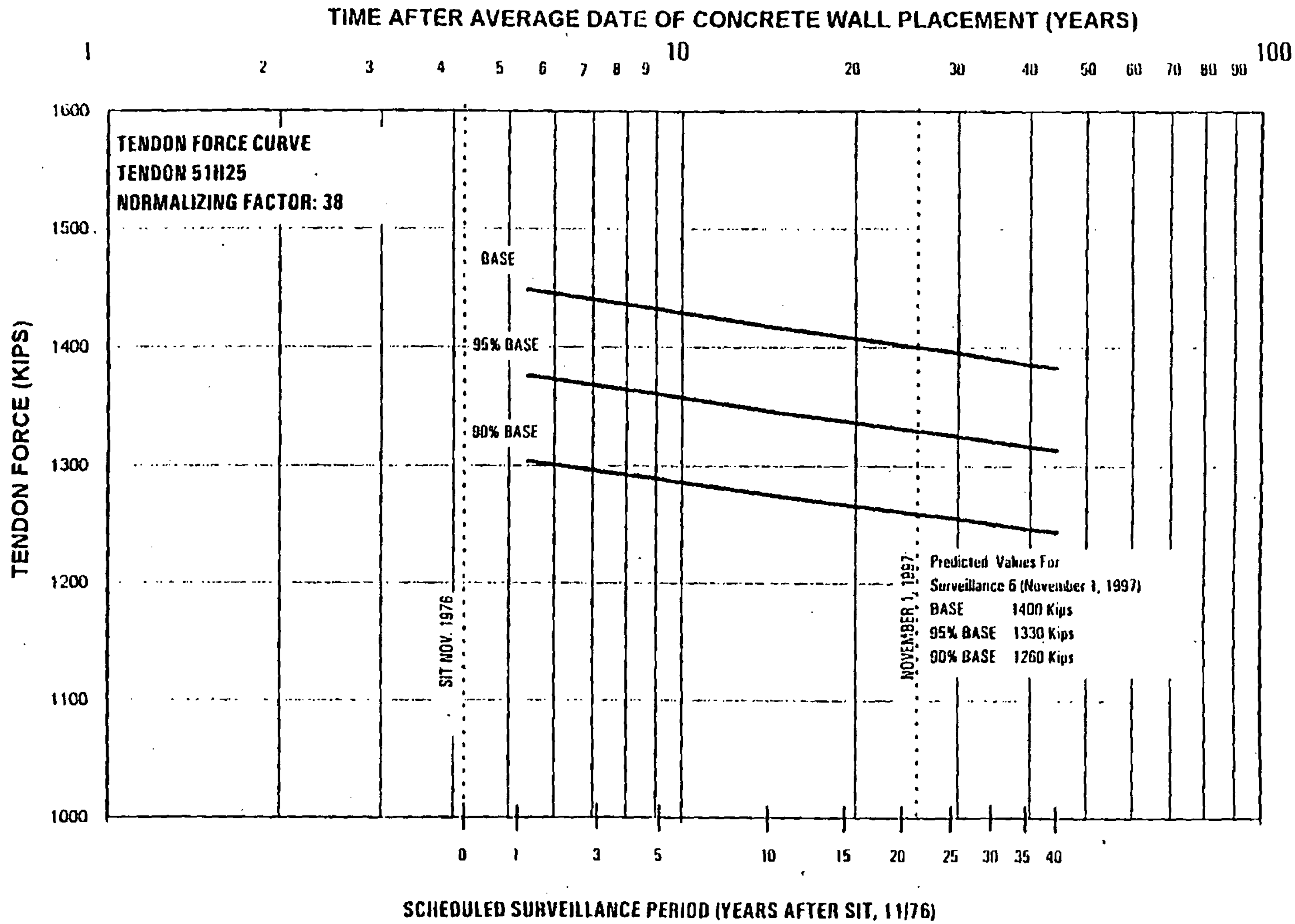

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 42H32
NORMALIZING FACTOR: -15
BASE
95% BASE
90% BASE
1600 1500 1400 1300 1200 1100 1000
TENDON FORCE (KIPS)
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1452 Kips
95% BASE 1379 Kips
90% BASE 1306 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

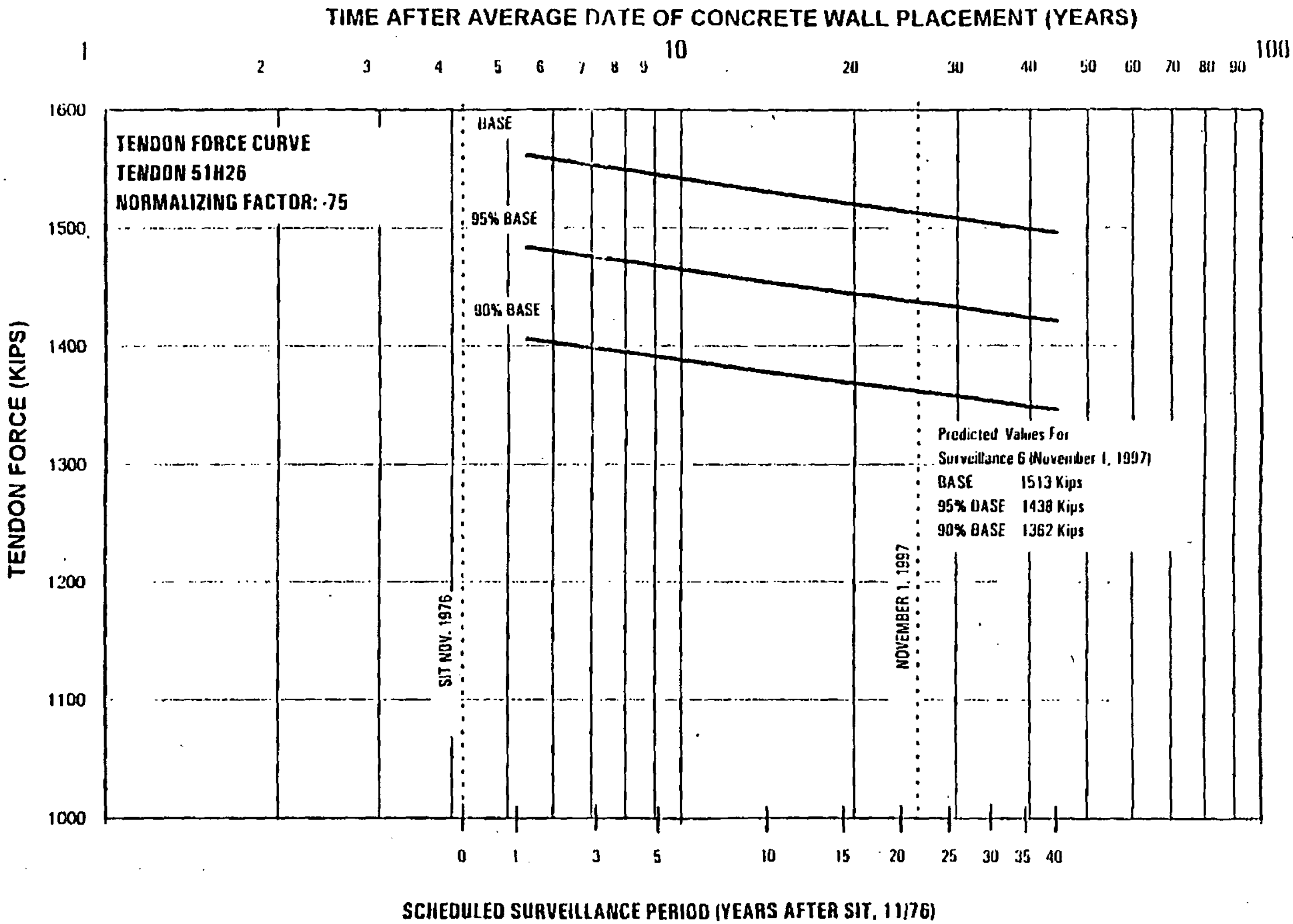

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 42H33
NORMALIZING FACTOR: -35
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1473 Kips
95% BASE 1399 Kips
90% BASE 1326 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

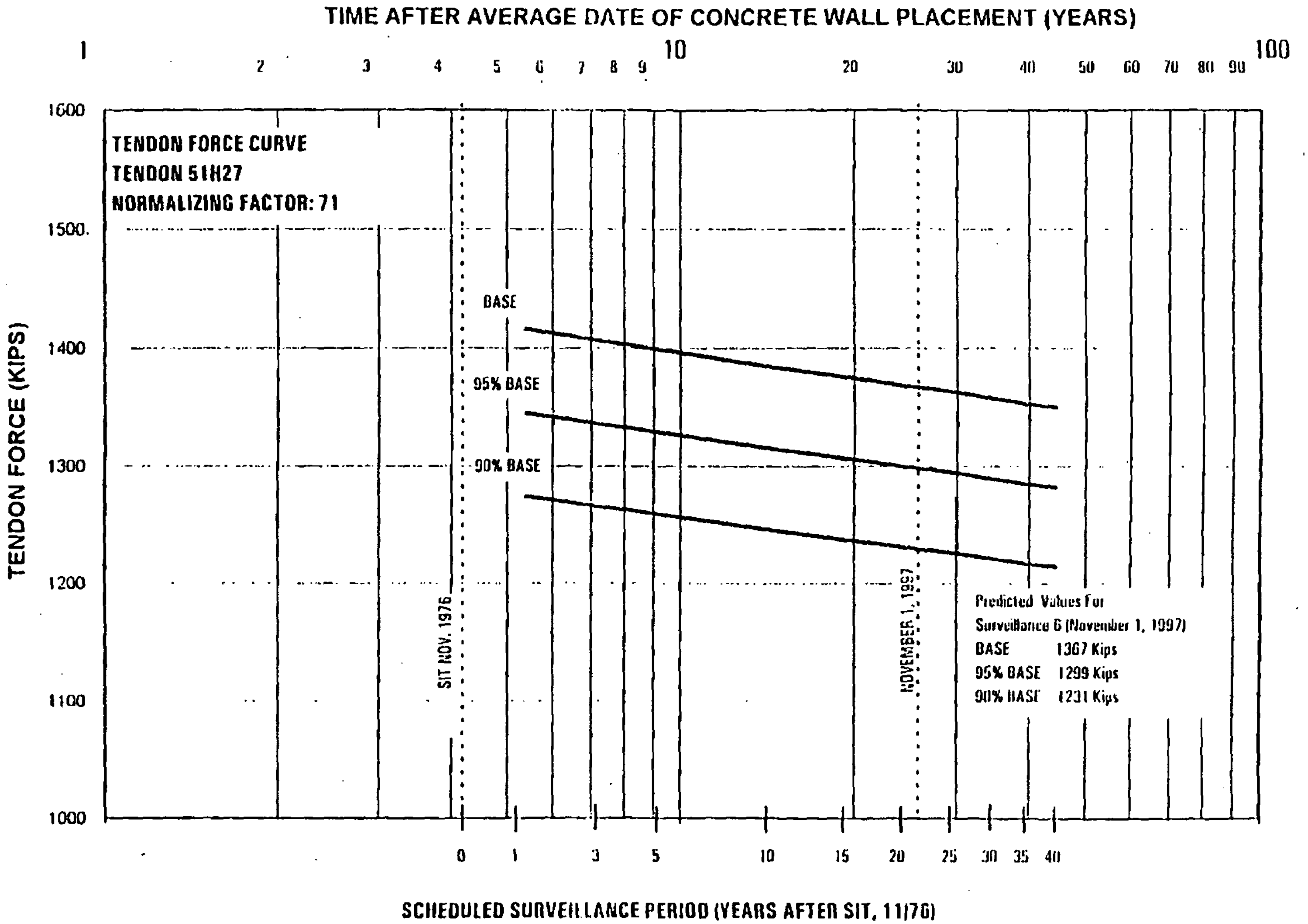

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 42H43
NORMALIZING FACTOR: 11
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1426 Kips
95% BASE 1355 Kips
90% BASE 1283 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

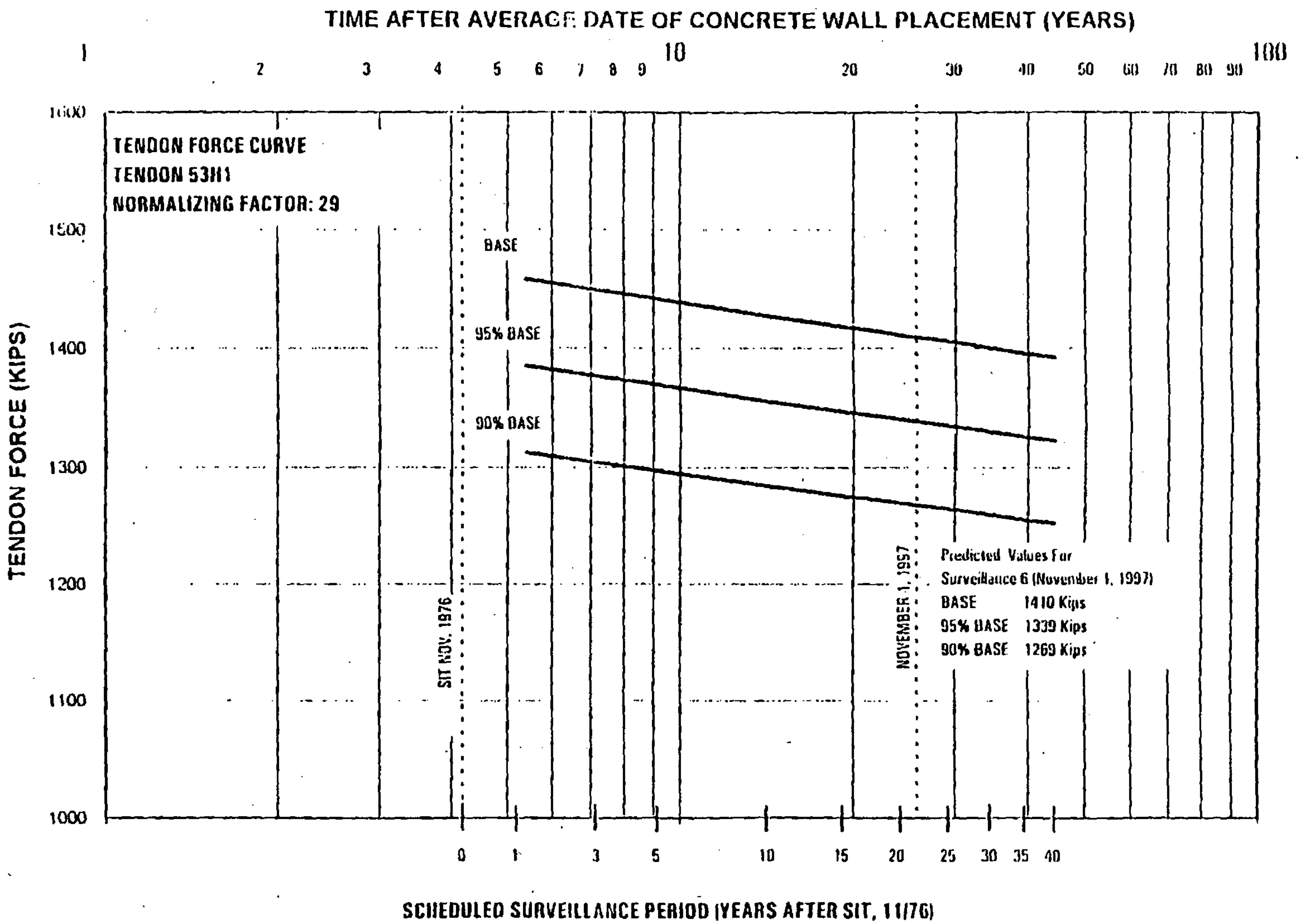

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 42H44
NORMALIZING FACTOR: 10
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1426 Kips
95% BASE 1355 Kips
90% BASE 1284 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

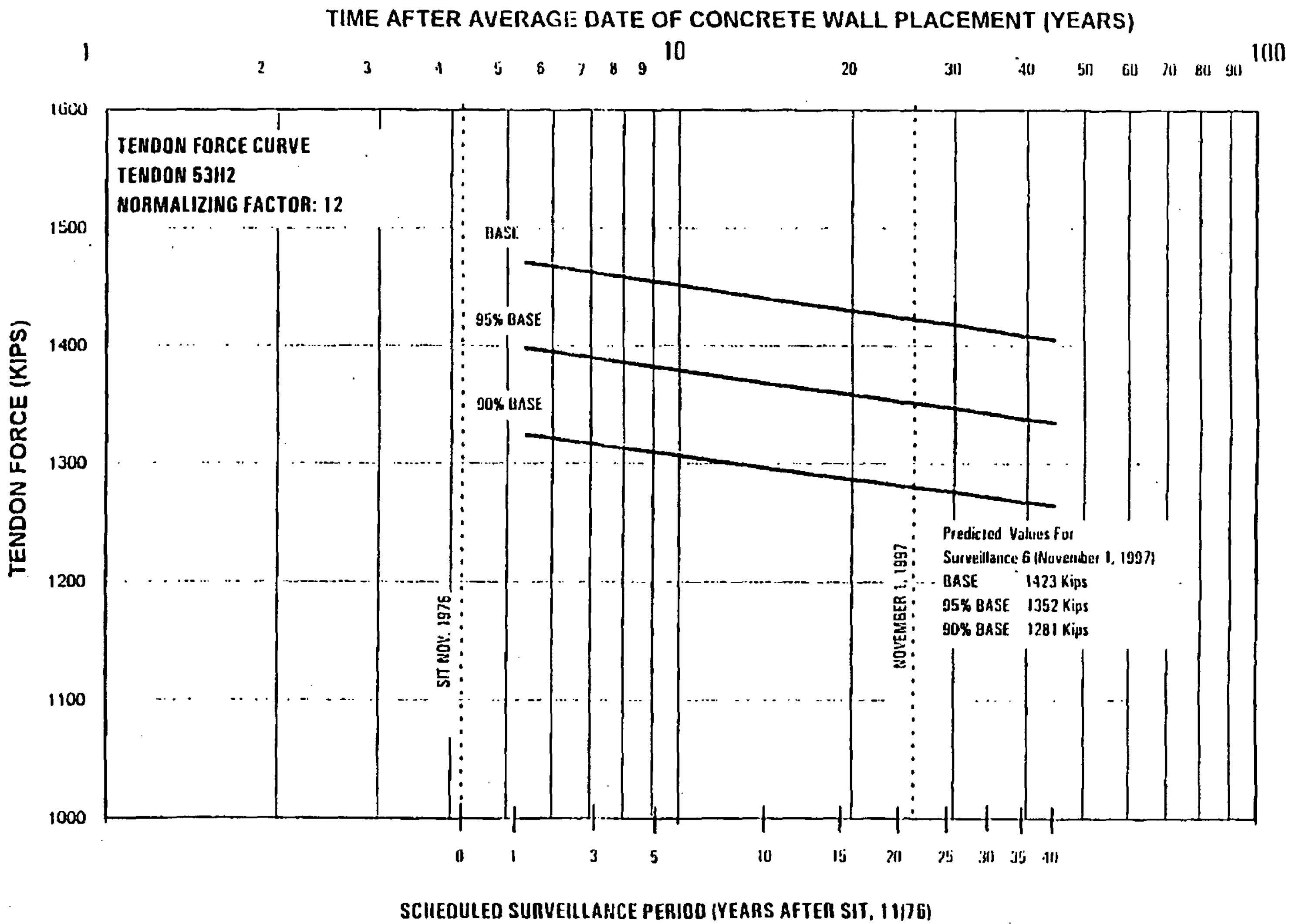

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 42H45
NORMALIZING FACTOR: -44
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1482 Kips
95% BASE 1408 Kips
90% BASE 1334 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

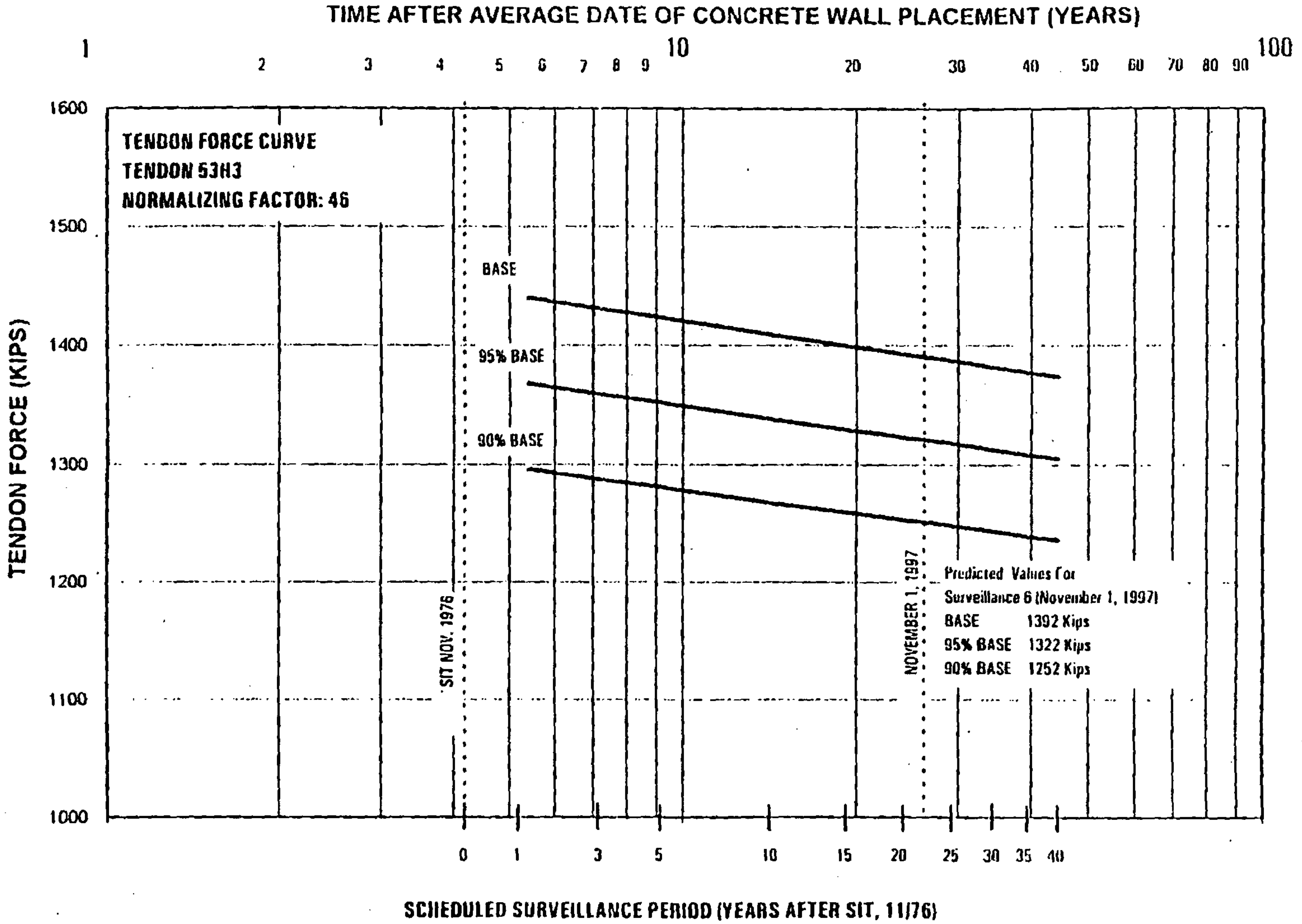

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1
2
3
4
5
6
7
8
9
10
20
30
40
50
60
70
80
90
100
TENDON FORCE CURVE
TENDON 51H25
NORMALIZING FACTOR: 38
TENDON FORCE (KIPS)
1600
1500
1400
1300
1200
1100
1000
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1400 Kips
95% BASE 1330 Kips
90% BASE 1260 Kips
0
1
3
5
10
15
20
25
30
35
40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

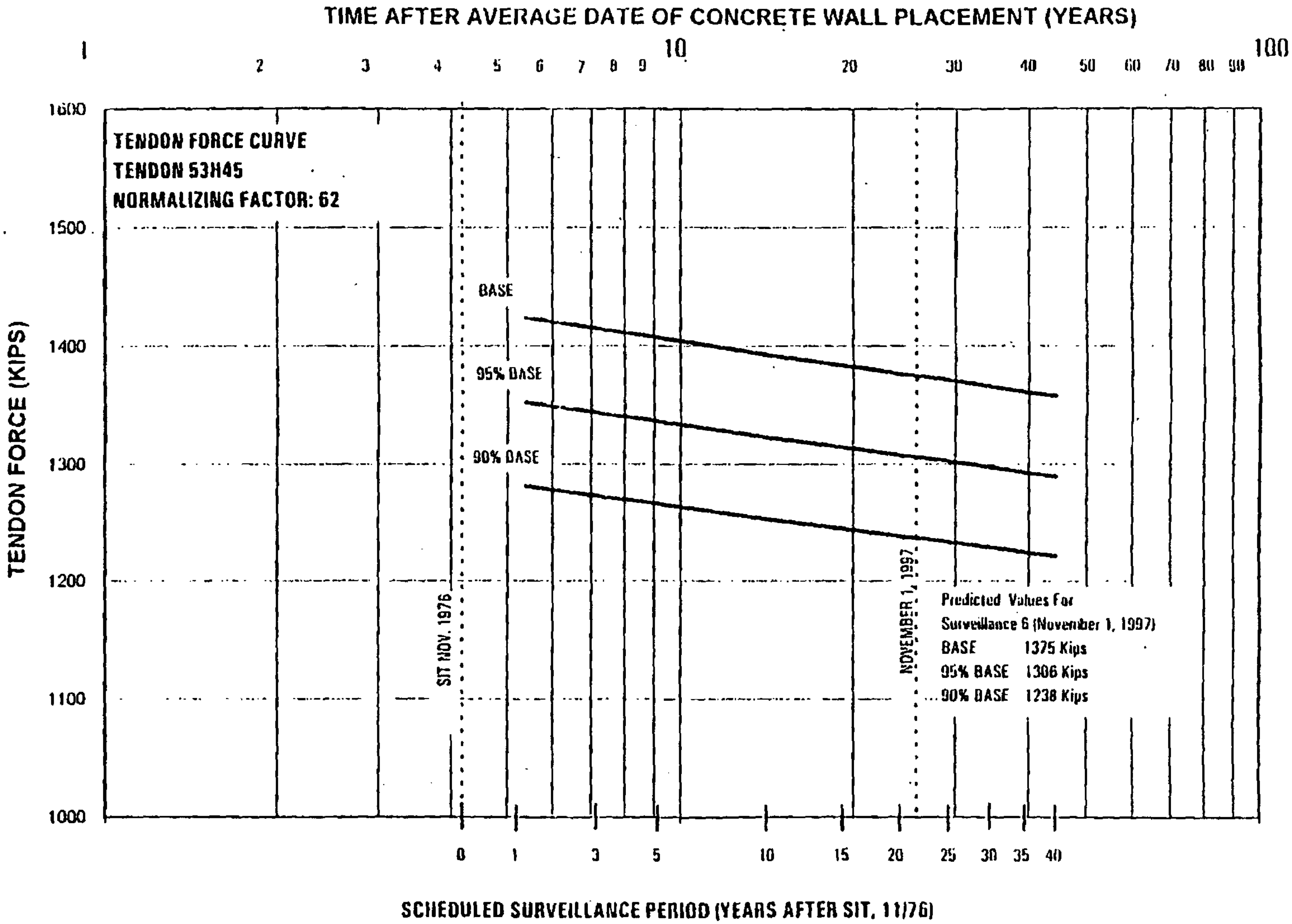

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1
2
3
4
5
6
7
8
9
10
20
30
40
50
60
70
80
90
100
TENDON FORCE CURVE
TENDON 51H26
NORMALIZING FACTOR: -75
BASE
95% BASE
90% BASE
1600
1500
1400
1300
1200
1100
1000
TENDON FORCE (KIPS)
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1513 Kips
95% BASE 1438 Kips
90% BASE 1362 Kips
0
1
3
5
10
15
20
25
30
35
40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

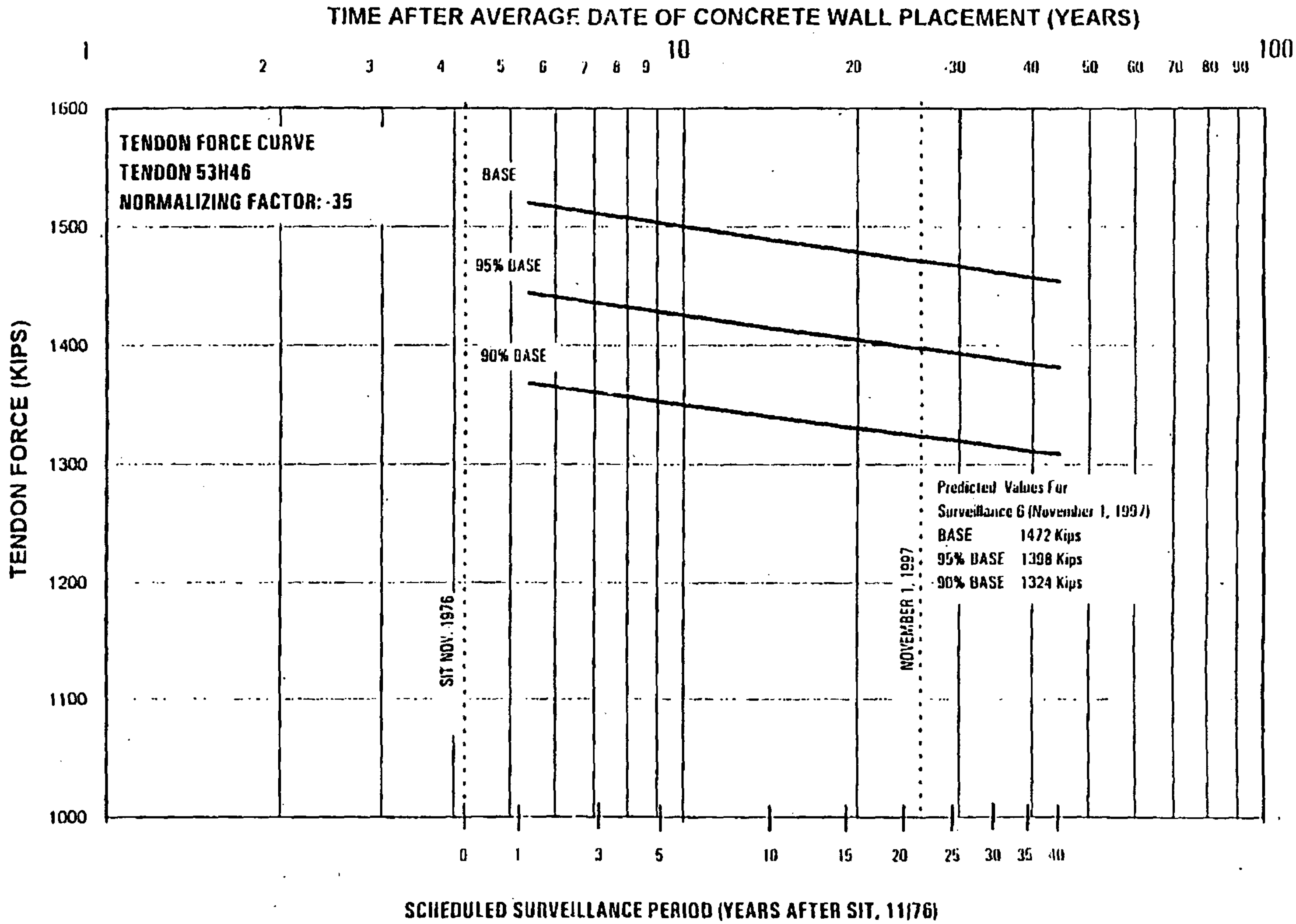

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 51H27
NORMALIZING FACTOR: 71
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1367 Kips
95% BASE 1299 Kips
90% BASE 1231 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

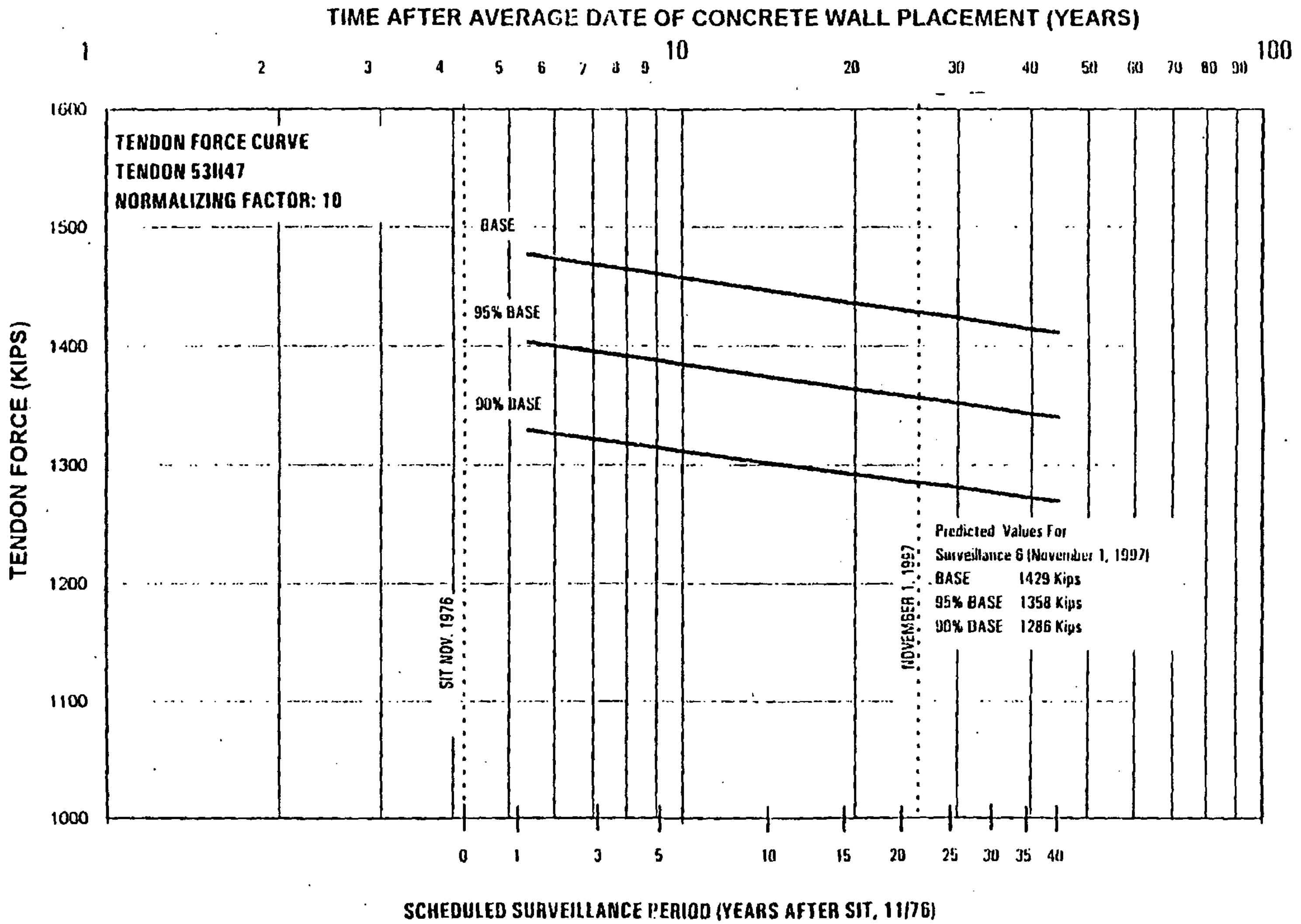

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 53H1
NORMALIZING FACTOR: 29
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1410 Kips
95% BASE 1339 Kips
90% BASE 1269 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

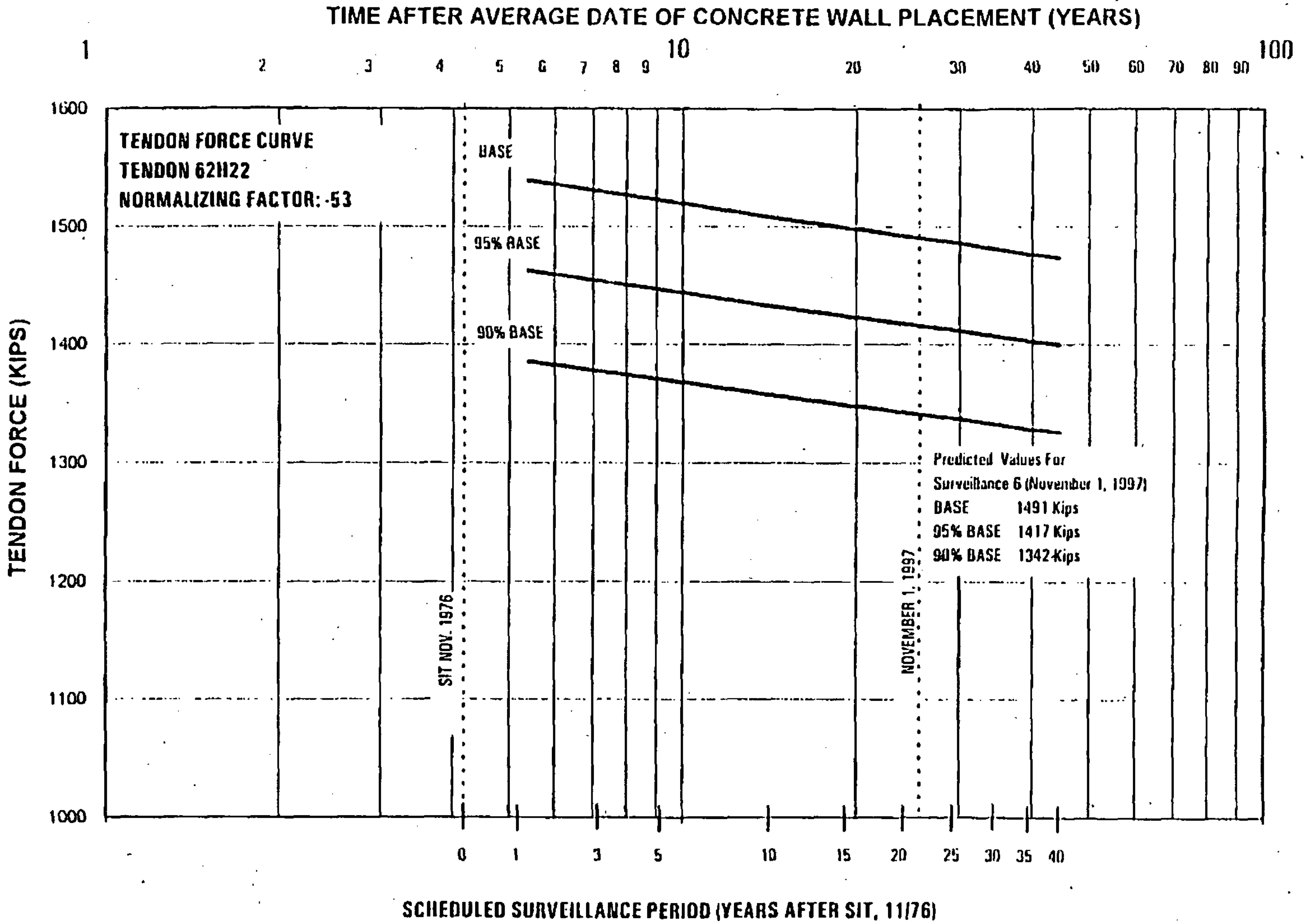

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 53H2
NORMALIZING FACTOR: 12
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1423 Kips
95% BASE 1352 Kips
90% BASE 1281 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

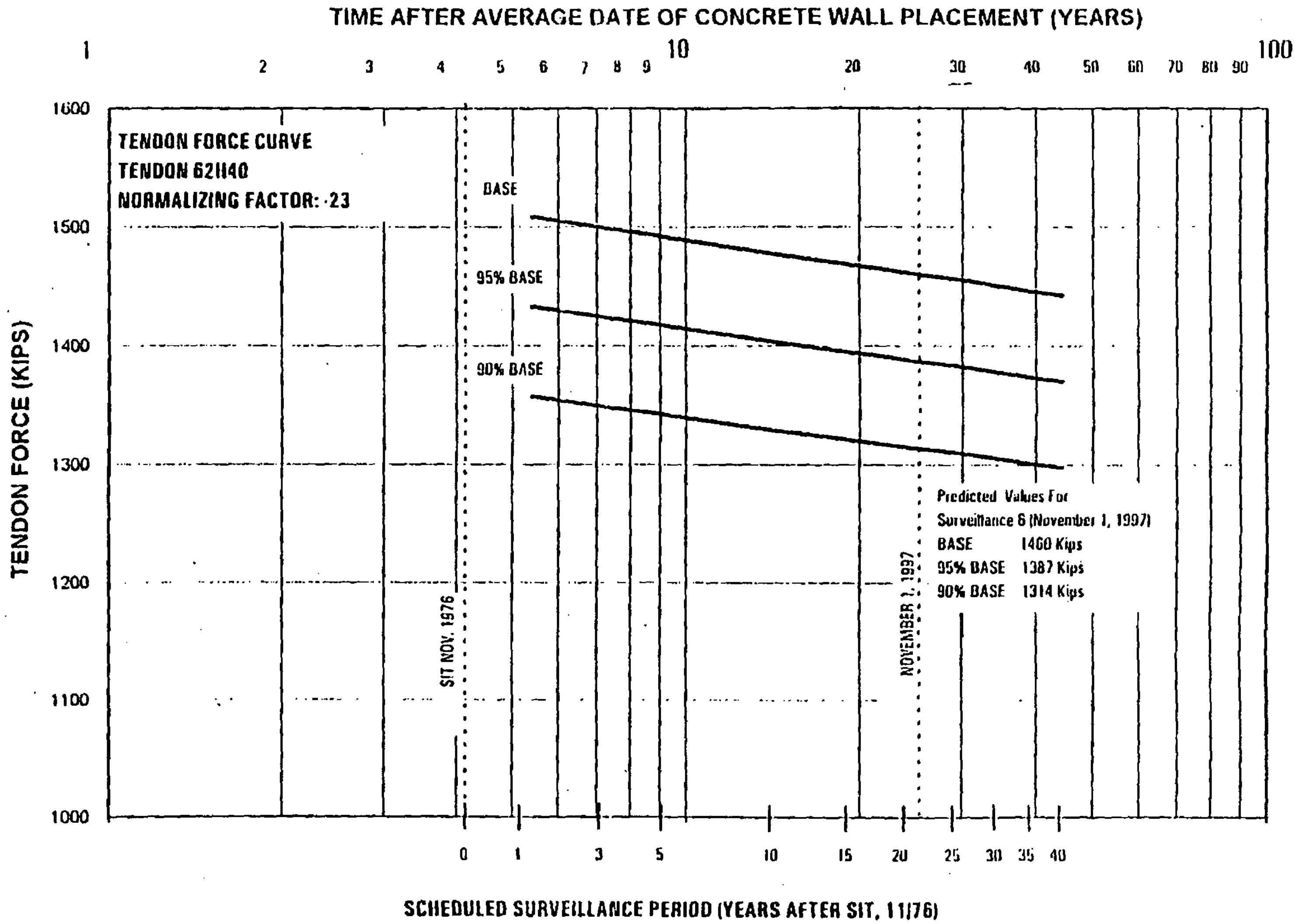

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1
2
3
4
5
6
7
8
9
10
20
30
40
50
60
70
80
90
100
TENDON FORCE CURVE
TENDON 53H3
NORMALIZING FACTOR: 46
1600
1500
1400
1300
1200
1100
1000
TENDON FORCE (KIPS)
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1392 Kips
95% BASE 1322 Kips
90% BASE 1252 Kips
0
1
3
5
10
15
20
25
30
35
40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

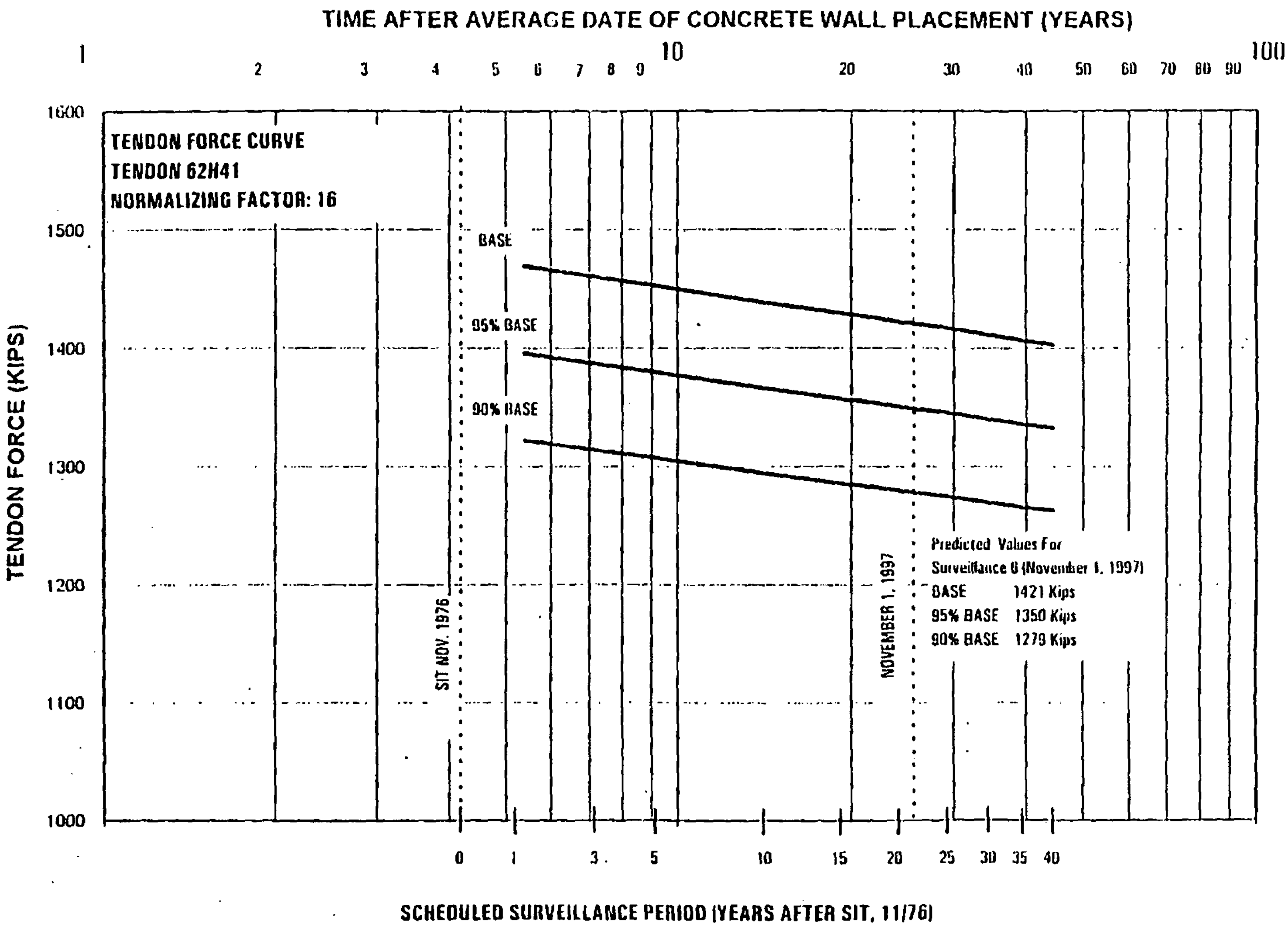

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 53H45
NORMALIZING FACTOR: 62
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1375 Kips
95% BASE 1306 Kips
90% BASE 1238 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

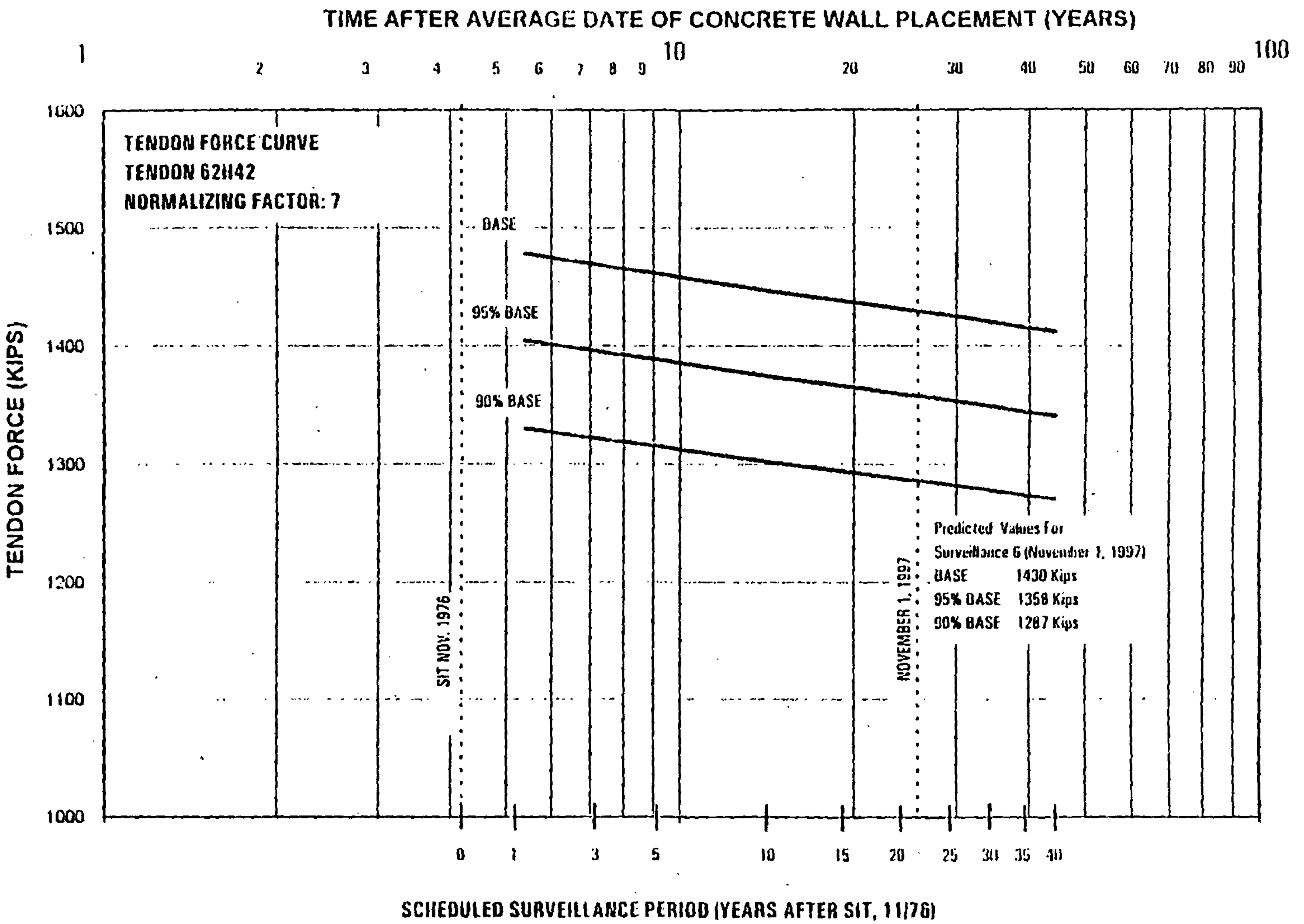

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 53H46
NORMALIZING FACTOR: -35
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1472 Kips
95% BASE 1398 Kips
90% BASE 1324 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

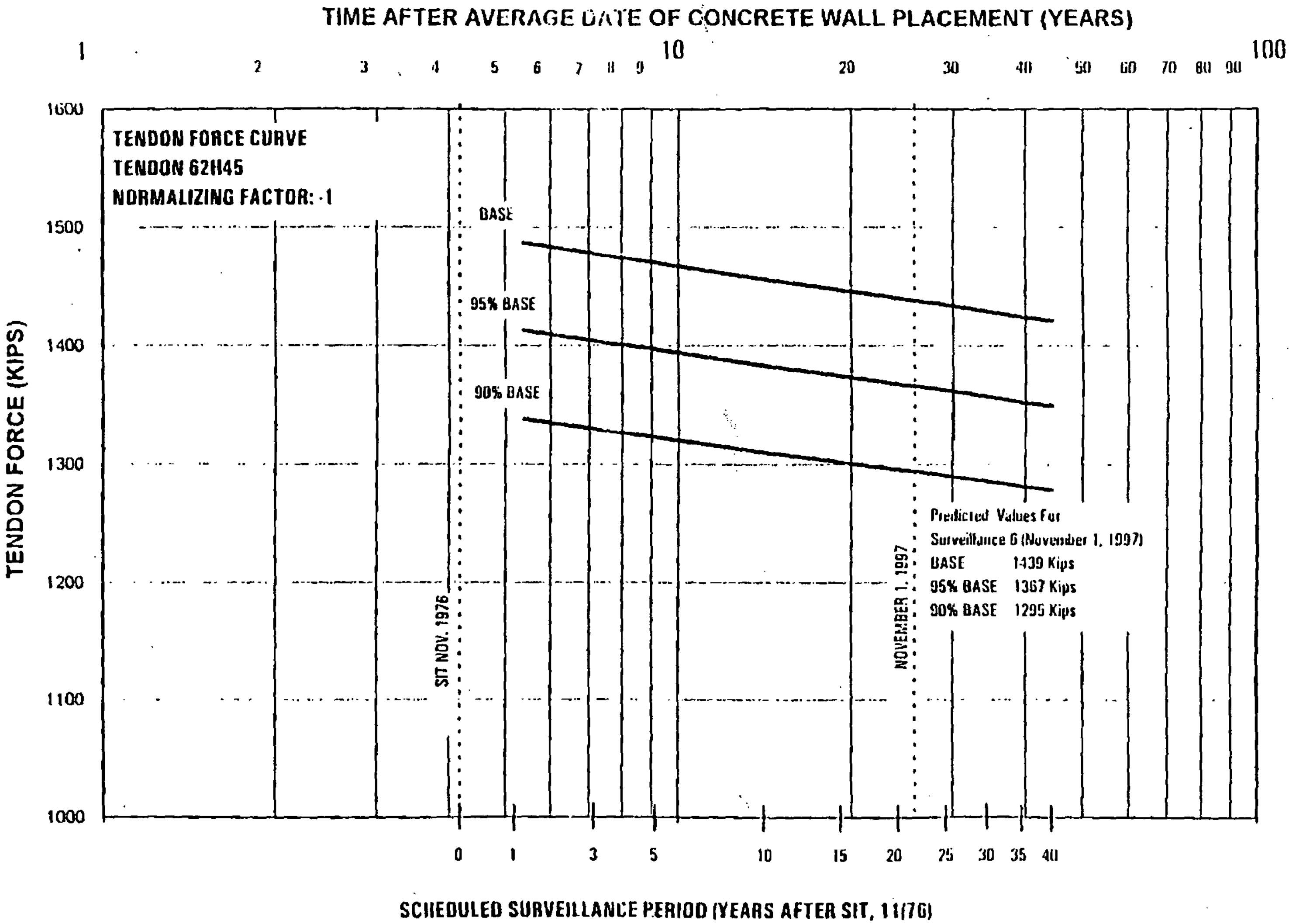

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 53H47
NORMALIZING FACTOR: 10
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1429 Kips
95% BASE 1358 Kips
90% BASE 1286 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

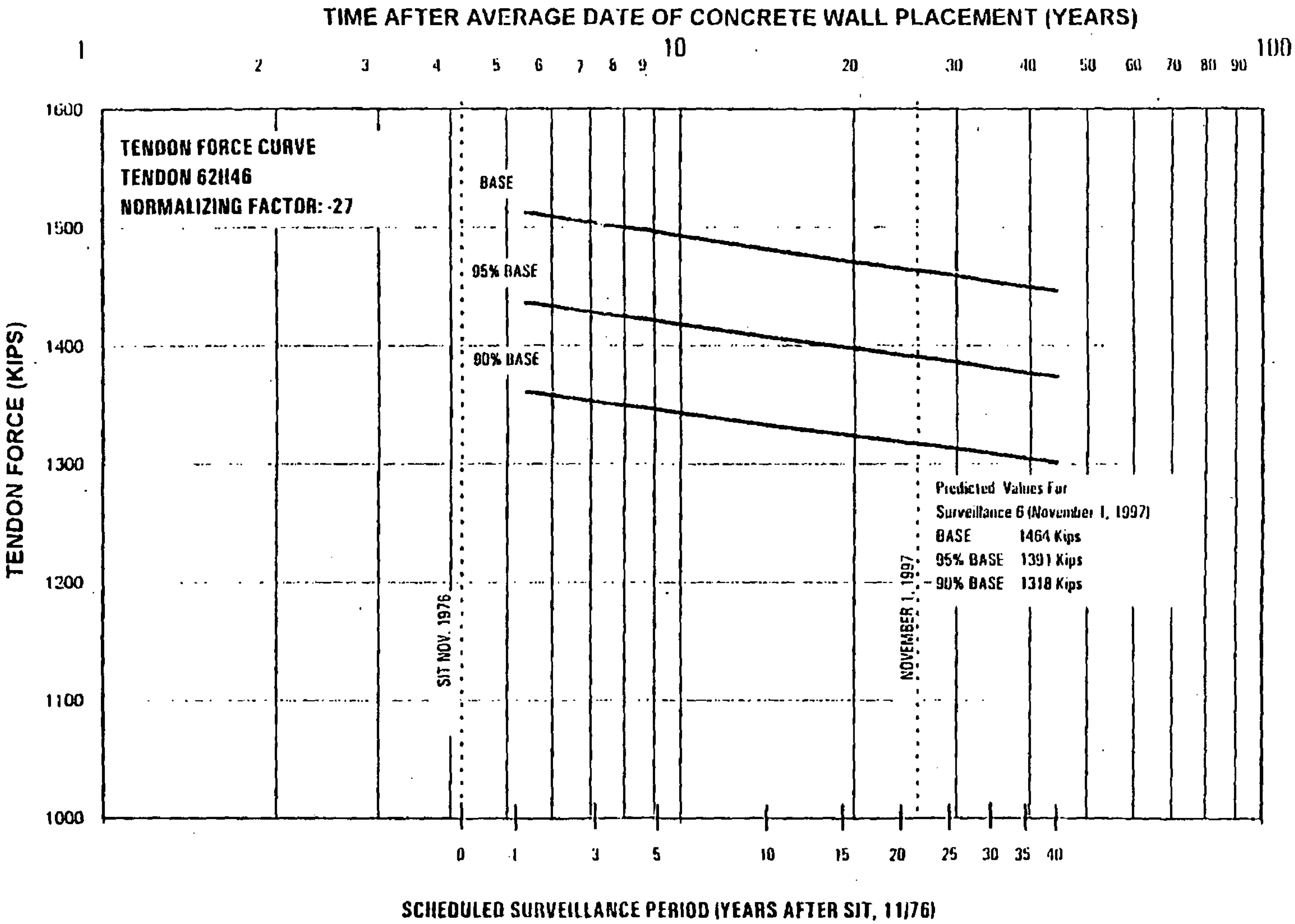

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 62H22
NORMALIZING FACTOR: -53
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1491 Kips
95% BASE 1417 Kips
90% BASE 1342 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

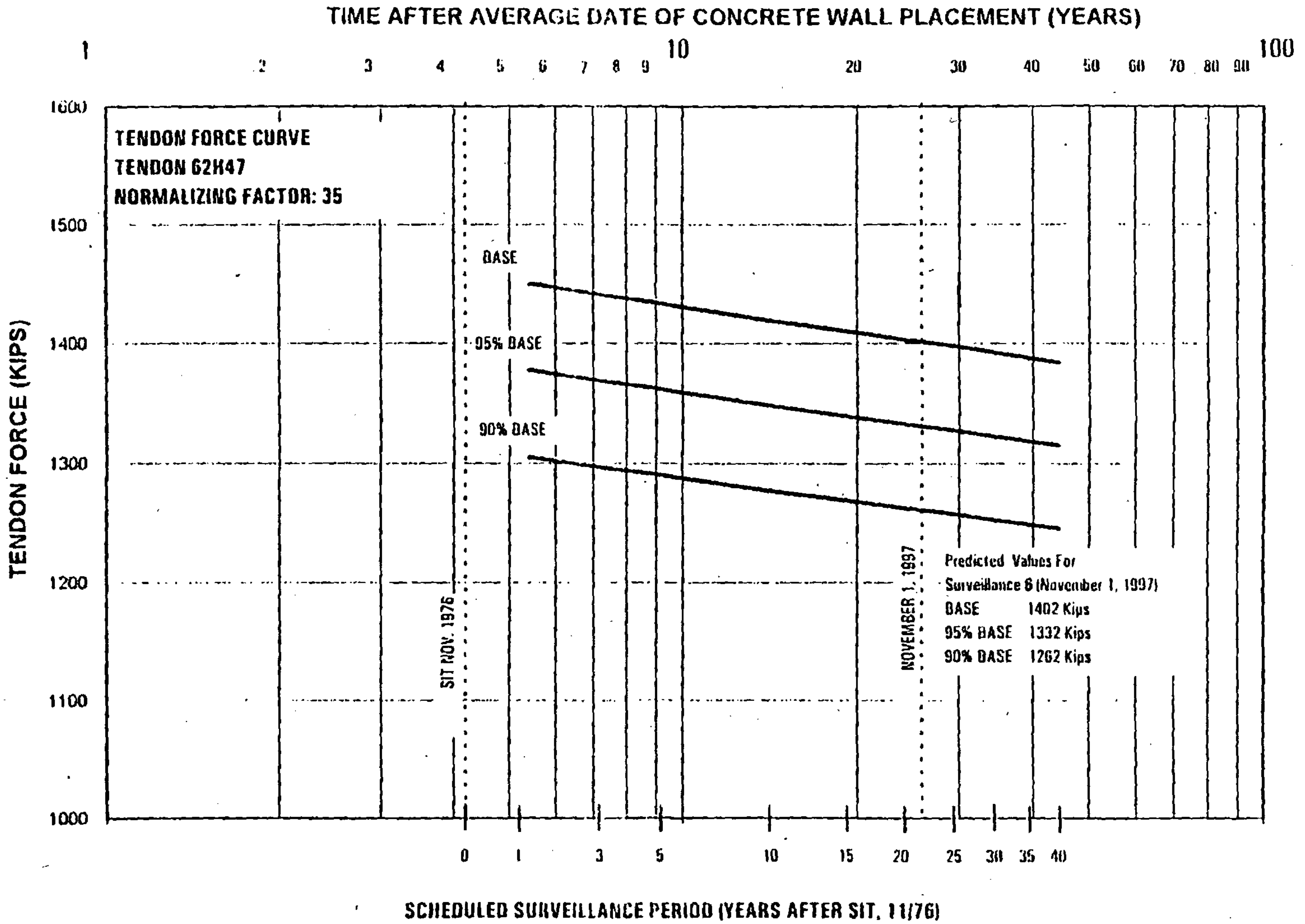

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 62H40
NORMALIZING FACTOR: ·23
BASE
95% BASE
90% BASE
TENDON FORCE (KIPS)
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1460 Kips
95% BASE 1387 Kips
90% BASE 1314 Kips
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)


TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 62H41
NORMALIZING FACTOR: 16
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1421 Kips
95% BASE 1350 Kips
90% BASE 1279 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

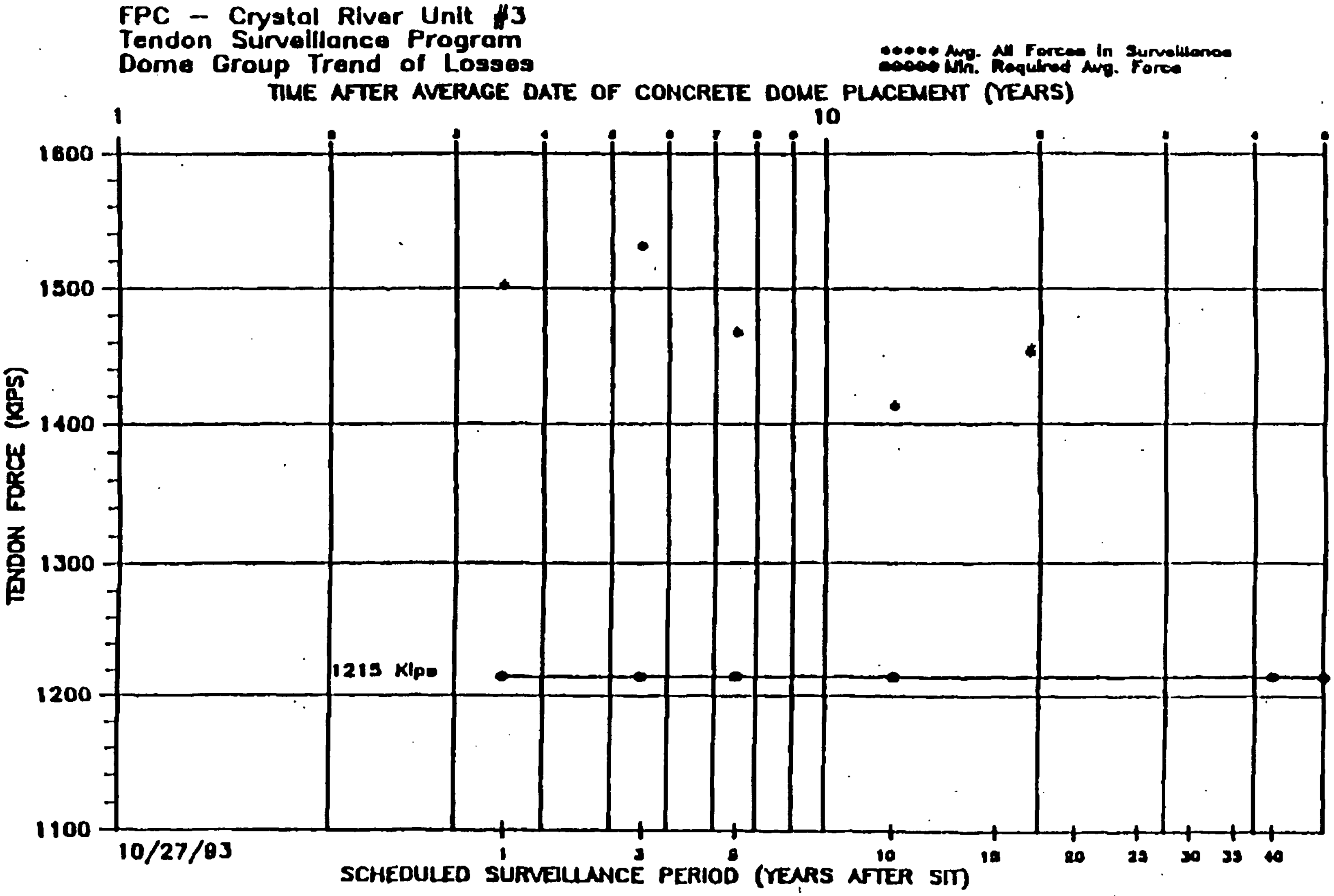

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 62H42
NORMALIZING FACTOR: 7
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1430 Kips
95% BASE 1358 Kips
90% BASE 1287 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)


TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 62H45
NORMALIZING FACTOR: 1
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1439 Kips
95% BASE 1367 Kips
90% BASE 1295 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

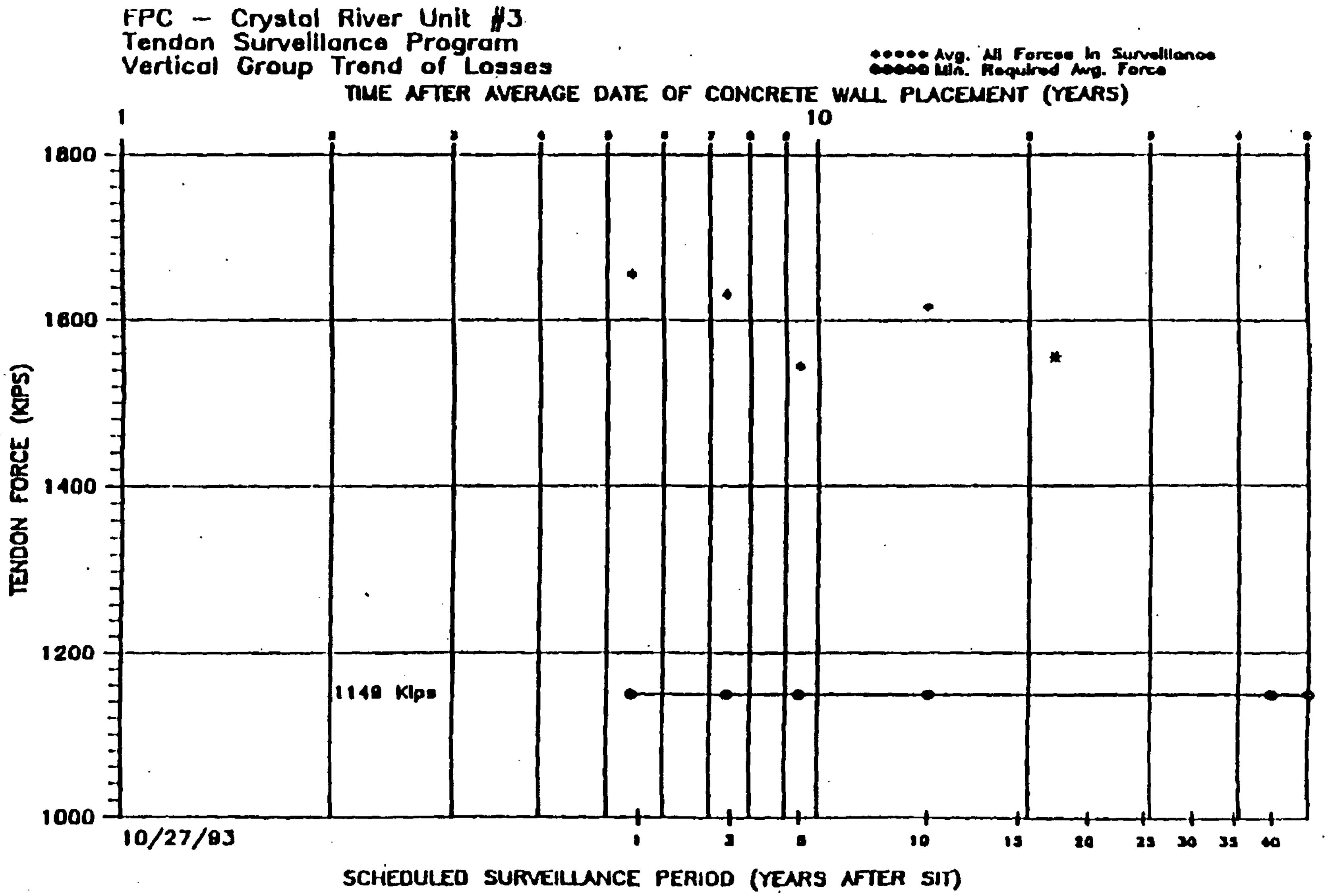

TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
TENDON FORCE CURVE
TENDON 62H46
NORMALIZING FACTOR: -27
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1464 Kips
95% BASE 1391 Kips
90% BASE 1318 Kips
TENDON FORCE (KIPS)
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)


TIME AFTER AVERAGE DATE OF CONCRETE WALL PLACEMENT (YEARS)
1 2 3 4 5 6 7 8 9 10 20 30 40 50 60 70 80 90 100
TENDON FORCE CURVE
TENDON 62H47
NORMALIZING FACTOR: 35
TENDON FORCE (KIPS)
1600 1500 1400 1300 1200 1100 1000
BASE
95% BASE
90% BASE
SIT NOV. 1976
NOVEMBER 1, 1997
Predicted Values For
Surveillance 6 (November 1, 1997)
BASE 1402 Kips
95% BASE 1332 Kips
90% BASE 1262 Kips
0 1 3 5 10 15 20 25 30 35 40
SCHEDULED SURVEILLANCE PERIOD (YEARS AFTER SIT, 11/76)

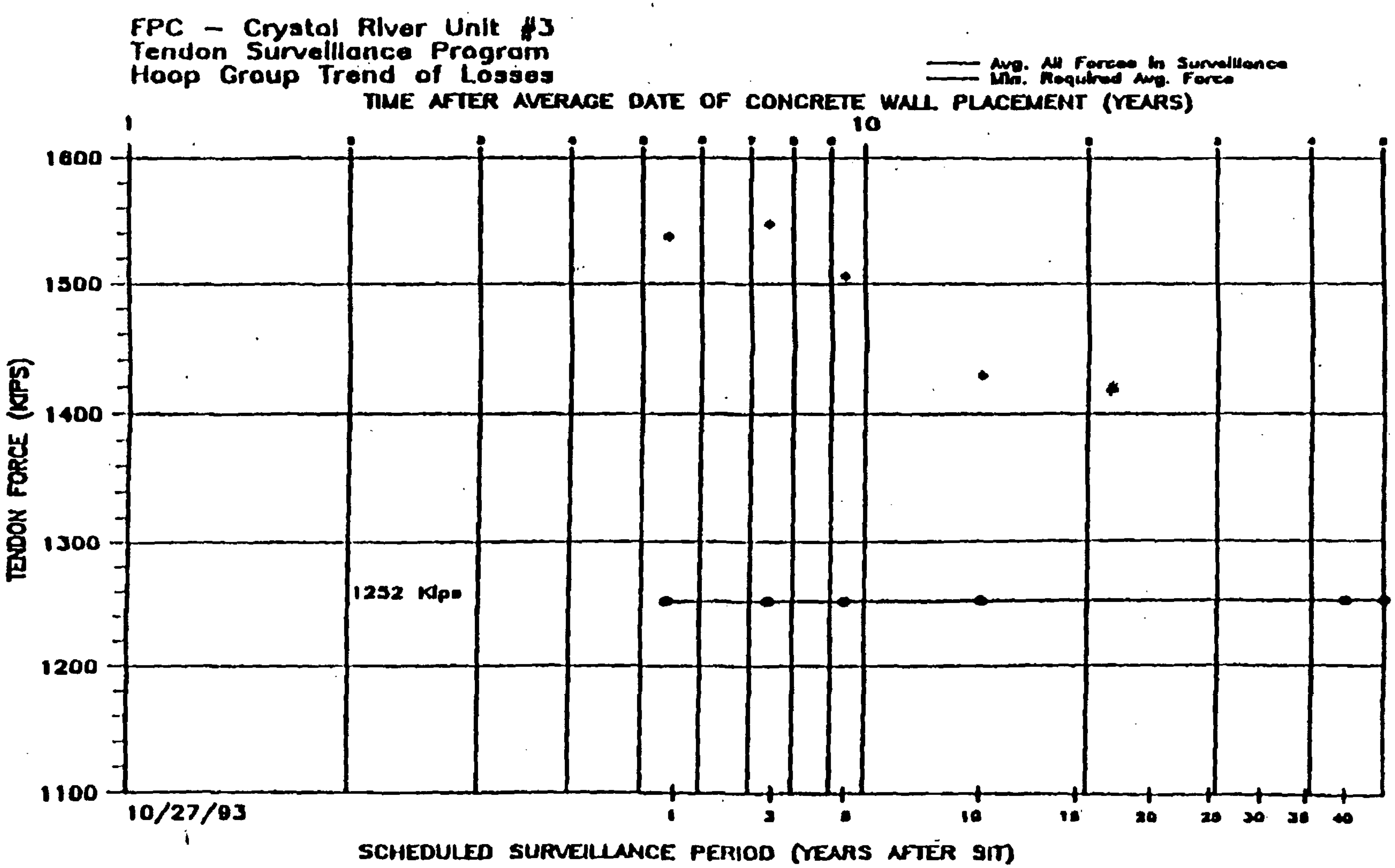
TENDON HISTORICAL TRENDS
DOME TENDONS



TENDON HISTORICAL TRENDS
VERTICAL TENDONS



TENDON HISTORICAL TRENDS
HOOP TENDONS



WORK PACKAGE DOCUMENTATION

NU 0341602

Related MAR No. ____________________ Work Request No. ____________________

Documents that are contained in a Work Package are to be identified. The completed checksheet must be included as part of the total Work Package.

*Original Work Request	*Request for Engineering Assistance (REA)	
*WR Continuation Sheet(s)	*Engineering Instructions	
Work Package Documentation Check Sheet	*Mov Analysis/Calculation Sheets	
*PRC-Approved Contractor Work Procedure(s)	Pre-job briefing/Training Attendance Sheet(s)	
*Weld Traveler Sheet(s)	Warehouse Release Tag(s)	
Material Certification(s)	Vendor Correspondence	
*FPWP(s): Write FPWP number(s) on WR.	*Inspection Plan Document Evaluation Form and all Inspection Plans	
*Issue Doc(s)	Maintenance Deficiency Tag	
Interim Print(s), Drawing(s), Sketch(es)	Fire Barrier Penetration Breach Report	
*For EQ Euipment, EQ RequirementReview Form	*Equipment Alteration Log	
*NPRDS Form	*ASME XI Work Evaluation Request	
PA&TS and/or Procedure Cover Sheet	*ASME XI Replacement Evaluation	
Procedure Sign-Off Sheets/ *Procedure Data Sheets	*ASME XI Repair Evaluation	
*Procedure Check-Off Lists		
*NDE Test Reports		
*Calibration Data Sheet(s)		
*Cable Pull Data; Terminate/Determinate Sheet(s)		
QC Inspection Reports		
*Instr. Data Sheets		

NOTE: Quality documentation to be included on the final Work Package is identified above by an asterisk(*).

COMMENTS: ____

Document Header Sheet

VSNEWFOLD

RAN 9ØØ57- 1523

DOCNO: WR 368426

3F3N # PART 1 of 7