



Institute of Paper Science and Technology

**CONTINUOUS BASE-LINE STUDY
(MULTI-WALL BAG PAPER DATA FOR JUL-AUG, SEPT-OCT, NOV-DEC, 1991)**

A Progress Report

to

THE KRAFT & PACKAGING PAPERS DIVISION

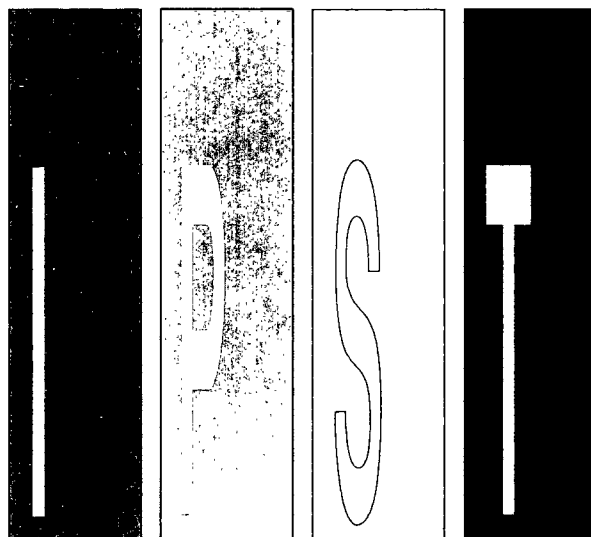
OF THE

AMERICAN PAPER INSTITUTE

Project 3710

Report Three

March 1, 1992



Atlanta, Georgia

KPPD BASE-LINE
2nd HALF, 1991

THE INSTITUTE OF PAPER SCIENCE AND TECHNOLOGY

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TABLE OF CONTENTS

SUMMARY	1
ONE YEAR TREND PLOTS	8
INTRODUCTION	28
PRESENTATION OF DATA	29

MONTHLY AVERAGES OF MILL DATA

Table I-II-III	30-38
Table IV-V-VI	39-47
Table VII-VIII-IX	48-56
Table X-XI-XII	57-68
Table XIII-XIV-XV	69-80

DATA ON CONDITIONING AND TESTING ENVIRONMENTS

Table XVI	81
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TEAR AND TENSILE TESTING VARIABLES

Table XVII	82
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APPENDIX	Notes A and B	83
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Part I: SUMMARY OF MOISTURE CONTENT DATA

		Jul–Aug		Sept–Oct		Nov–Dec	
Multiwall Grade Wt.		Moisture Content, %					
40 lb. Flat	AVG	5.5	(9)	5.5	(10)	5.5	(7)
	S.D.	0.71		0.69		1.08	
50 lb. Flat	AVG	5.5	(13)	5.5	(14)	5.5	(12)
	S.D.	0.68		0.84		0.95	
60 lb. Flat	AVG	5.6	(10)	5.8	(10)	5.8	(8)
	S.D.	0.84		0.63		0.92	
50 lb. Ext.	AVG	4.9	(4)	4.5	(3)	3.7	(2)
	S.D.	1.11		1.12		0.42	
60 lb. Ext.	AVG	4.8	(4)	4.7	(3)	4.1	(2)
	S.D.	0.85		1.04		0.21	

Note: S.D. is Standard Deviation of current machine averages.

AVG is current KPPD average no. of machines is indicated in ().

Part II: SUMMARY OF ADJUSTED BASIS WEIGHT DATA

		Jul–Aug		Sept–Oct		Nov–Dec	
Multiwall Grade Wt.		Adjusted Basis Weight, lb/3000 sq.ft.					
40 lb. Flat	AVG	42.6	(9)	42.3	(10)	42.8	(7)
	S.D.	1.63		1.50		1.78	
50 lb. Flat	AVG	52.7	(13)	52.6	(14)	52.8	(12)
	S.D.	1.51		1.22		1.62	
60 lb. Flat	AVG	62.4	(10)	62.5	(10)	62.4	(8)
	S.D.	1.42		1.31		2.25	
50 lb. Ext.	AVG	51.8	(4)	52.3	(3)	52.4	(2)
	S.D.	0.90		1.02		1.77	
60 lb. Ext.	AVG	62.0	(4)	61.8	(3)	61.8	(2)
	S.D.	1.40		1.07		1.98	

Note: S.D. is Standard Deviation of current machine averages.

AVG is current KPPD average no. of machines is indicated in ().

Part III: SUMMARY OF POROSITY DATA

		Jul–Aug		Sept–Oct		Nov–Dec	
Multiwall Grade Wt.		Porosity, s/100 cc					
40 lb. Flat	AVG	9.6	(9)	9.9	(10)	8.0	(7)
	S.D.	4.12		3.95		3.51	
50 lb. Flat	AVG	11.3	(13)	11.2	(14)	9.4	(12)
	S.D.	5.21		4.30		4.41	
60 lb. Flat	AVG	11.1	(10)	11.9	(10)	10.1	(8)
	S.D.	4.51		4.78		4.86	
50 lb. Ext.	AVG	9.4	(4)	10.6	(3)	6.4	(2)
	S.D.	4.64		9.96		4.81	
60 lb. Ext.	AVG	9.6	(4)	11.3	(3)	6.4	(2)
	S.D.	4.68		10.15		4.74	

Note: S.D. is Standard Deviation of current machine averages.

AVG is current KPPD average no. of machines is indicated in ().

Part IV: SUMMARY OF TEAR RESISTANCE DATA

		Jul–Aug		Sept–Oct		Nov–Dec	
Multiwall Grade Wt.		MD Tear, g					
40 lb. Flat	AVG	95.0	(9)	96.7	(10)	98.0	(7)
	S.D.	4.71		5.87		5.45	
50 lb. Flat	AVG	127.8	(13)	124.3	(14)	127.2	(12)
	S.D.	7.48		8.51		6.93	
60 lb. Flat	AVG	155.0	(10)	154.6	(10)	154.3	(8)
	S.D.	11.13		13.79		11.94	
50 lb. Ext.	AVG	124.8	(4)	130.2	(3)	137.0	(2)
	S.D.	14.67		19.86		9.12	
60 lb. Ext.	AVG	149.8	(4)	163.7	(3)	163.6	(2)
	S.D.	19.23		24.95		22.06	

		Jul–Aug		Sept–Oct		Nov–Dec	
Multiwall Grade Wt.		Total Tear, g					
40 lb. Flat	AVG	201.9	(9)	202.4	(10)	204.4	(7)
	S.D.	5.62		10.19		8.28	
50 lb. Flat	AVG	265.7	(13)	256.1	(14)	262.3	(12)
	S.D.	13.08		13.39		11.98	
60 lb. Flat	AVG	317.8	(10)	322.0	(10)	318.8	(8)
	S.D.	16.87		26.21		23.10	
50 lb. Ext.	AVG	276.7	(4)	277.9	(3)	287.8	(2)
	S.D.	25.63		39.70		18.03	
60 lb. Ext.	AVG	312.7	(4)	352.5	(3)	346.9	(2)
	S.D.	78.48		31.38		40.09	

Note: S.D. is Standard Deviation of current machine averages.

AVG is current KPPD average no. of machines is indicated in ().

Part V: SUMMARY OF TENSILE DATA

		Jul-Aug	Sept-Oct	Nov-Dec
Multiwall Grade Wt.		CD Tensile, lb/in		
40 lb. Flat	AVG	16.6 (9)	16.5 (10)	16.8 (7)
	S.D.	0.98	1.12	1.85
50 lb. Flat	AVG	20.3 (13)	21.3 (14)	20.9 (12)
	S.D.	1.20	1.57	1.69
60 lb. Flat	AVG	24.9 (10)	24.8 (10)	24.8 (8)
	S.D.	1.61	1.66	2.25

		Jul-Aug	Sept-Oct	Nov-Dec
Multiwall Grade Wt.		Total Tensile, lb/in		
40 lb. Flat	AVG	46.9 (9)	46.6 (10)	46.6 (7)
	S.D.	2.75	3.35	2.65
50 lb. Flat	AVG	57.6 (12)	57.6 (14)	57.5 (12)
	S.D.	2.63	5.53	2.56
60 lb. Flat	AVG	69.8 (10)	70.8 (10)	69.0 (8)
	S.D.	2.44	2.80	2.68

Note: S.D. is Standard Deviation of current machine averages.
 AVG is current KPPD average no. of machines is indicated in ().

Part VI: SUMMARY OF STRETCH DATA

		Jul–Aug		Sept–Oct		Nov–Dec	
Multiwall Grade Wt.		MD Stretch, %					
50 lb. Extensible	AVG	6.9	(4)	6.7	(3)	7.1	(2)
	S.D.	0.90		0.96		1.48	
60 lb. Extensible	AVG	7.3	(4)	7.0	(3)	7.4	(2)
	S.D.	0.78		0.83		1.34	

		Jul-Aug		Sept-Oct		Nov-Dec	
Multiwall Grade Wt.		CD Stretch, %					
50 lb. Extensible	AVG	5.3	(4)	5.1	(3)	5.0	(2)
	S.D.	0.53		0.81		0.21	
60 lb. Extensible	AVG	5.1	(4)	5.3	(3)	4.8	(2)
	S.D.	0.62		0.44		0.42	

Note: S.D. is Standard Deviation of current machine averages.

AVG is current KPPD average no. of machines is indicated in ().

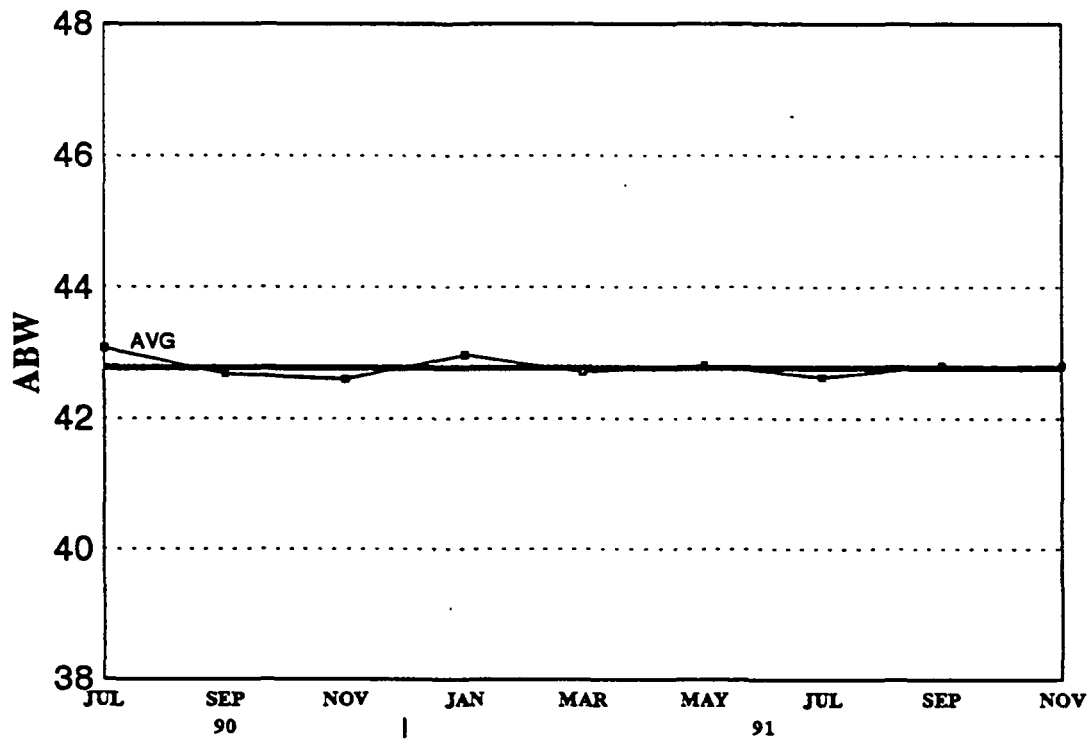
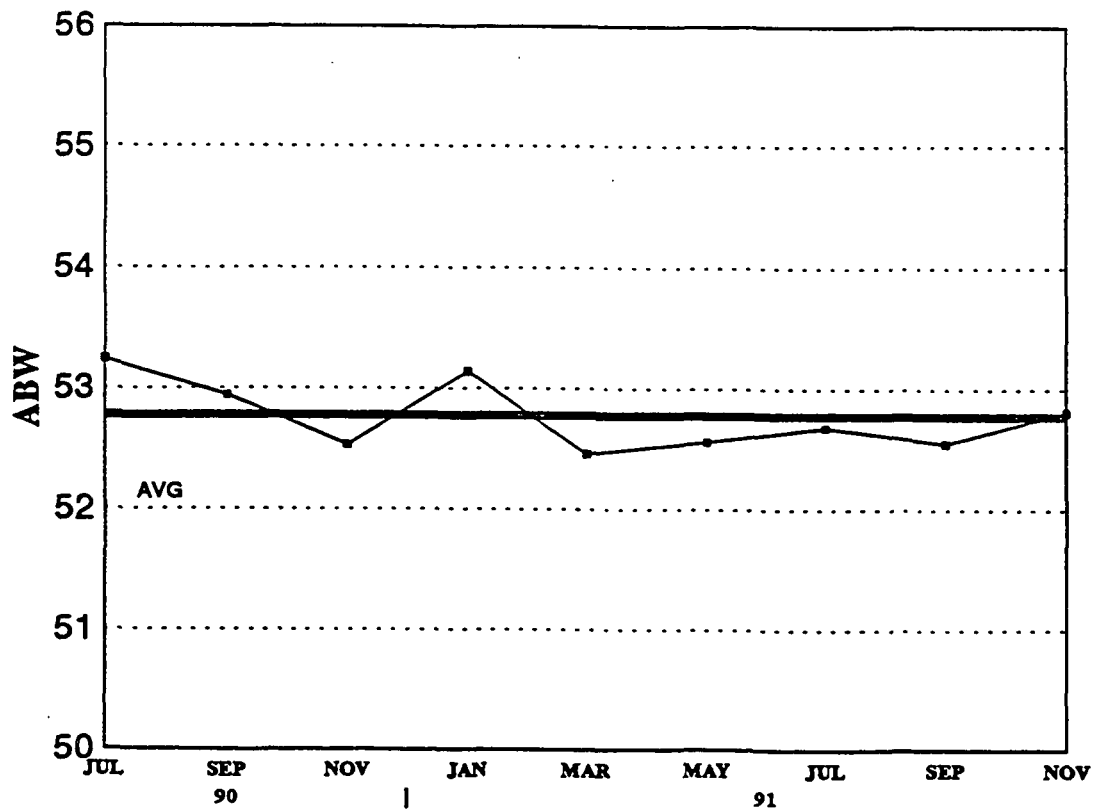
Part VII: SUMMARY OF TEA DATA

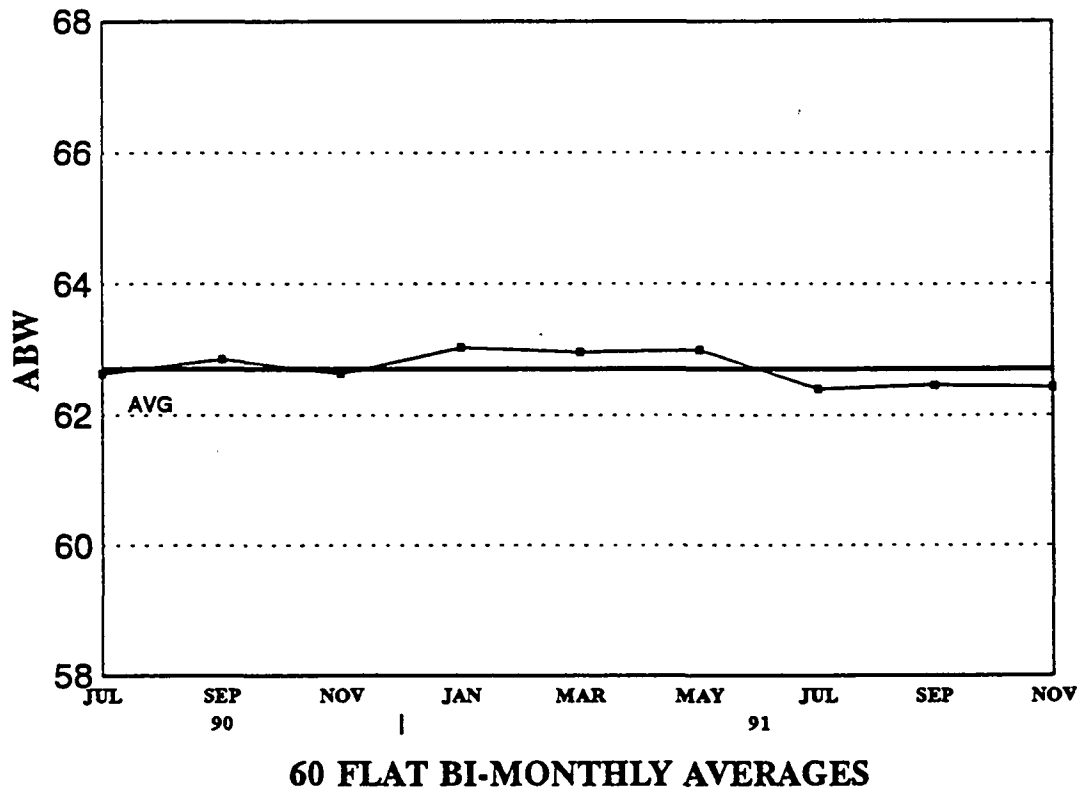
		Jul-Aug		Sept-Oct		Nov-Dec	
Multiwall Grade Wt.		CD TEA, ft.lb/sq.ft.					
50 lb. Extensible	AVG	7.8	(4)	7.1	(3)	7.1	(2)
	S.D.	1.34		1.01		0.92	
60 lb. Extensible	AVG	8.4	(4)	8.6	(3)	8.3	(2)
	S.D.	1.40		0.66		0.21	

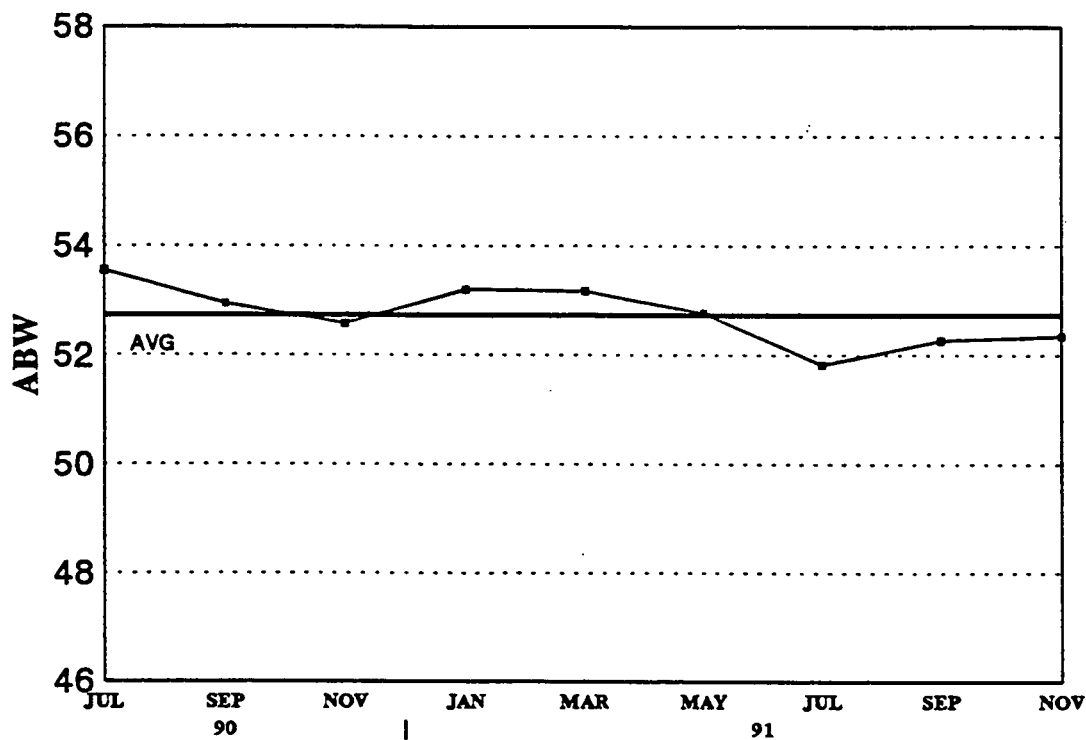
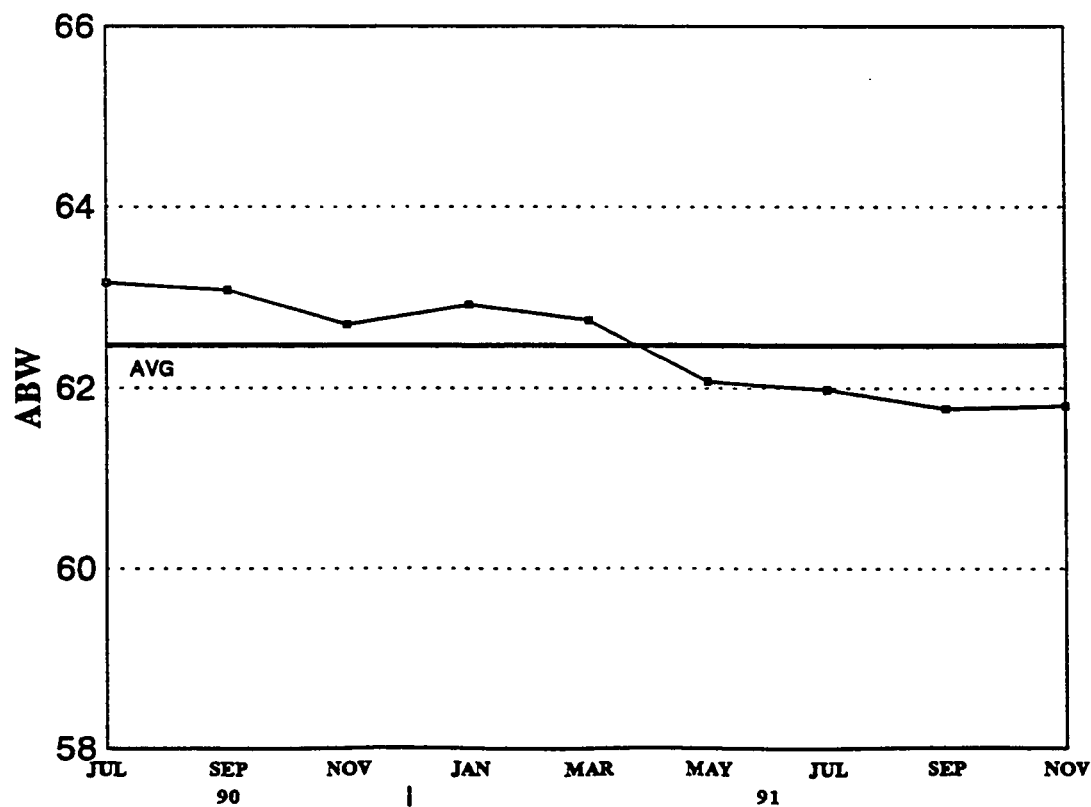
		Jul-Aug		Sept-Oct		Nov-Dec	
Multiwall Grade Wt.		Total TEA, ft.lb/sq.ft.					
50 lb. Extensible	AVG	20.8	(4)	19.7	(3)	19.1	(2)
	S.D.	1.97		0.53		1.27	
60 lb. Extensible	AVG	24.1	(4)	23.5	(3)	22.6	(2)
	S.D.	2.54		0.81		2.05	

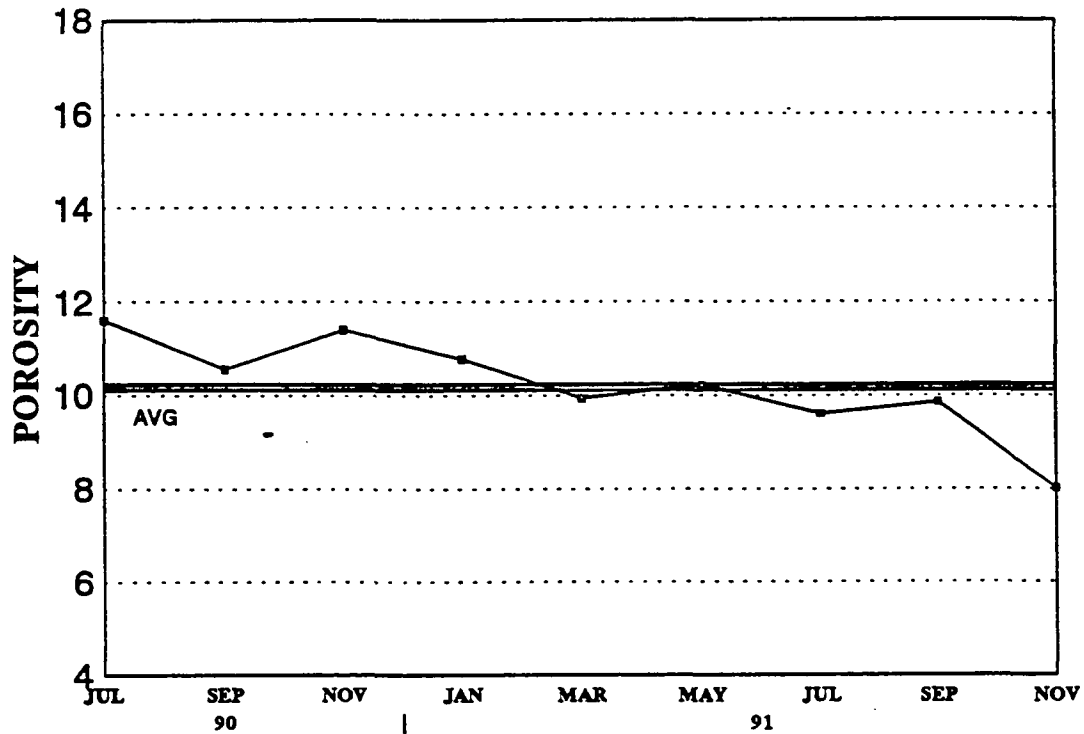
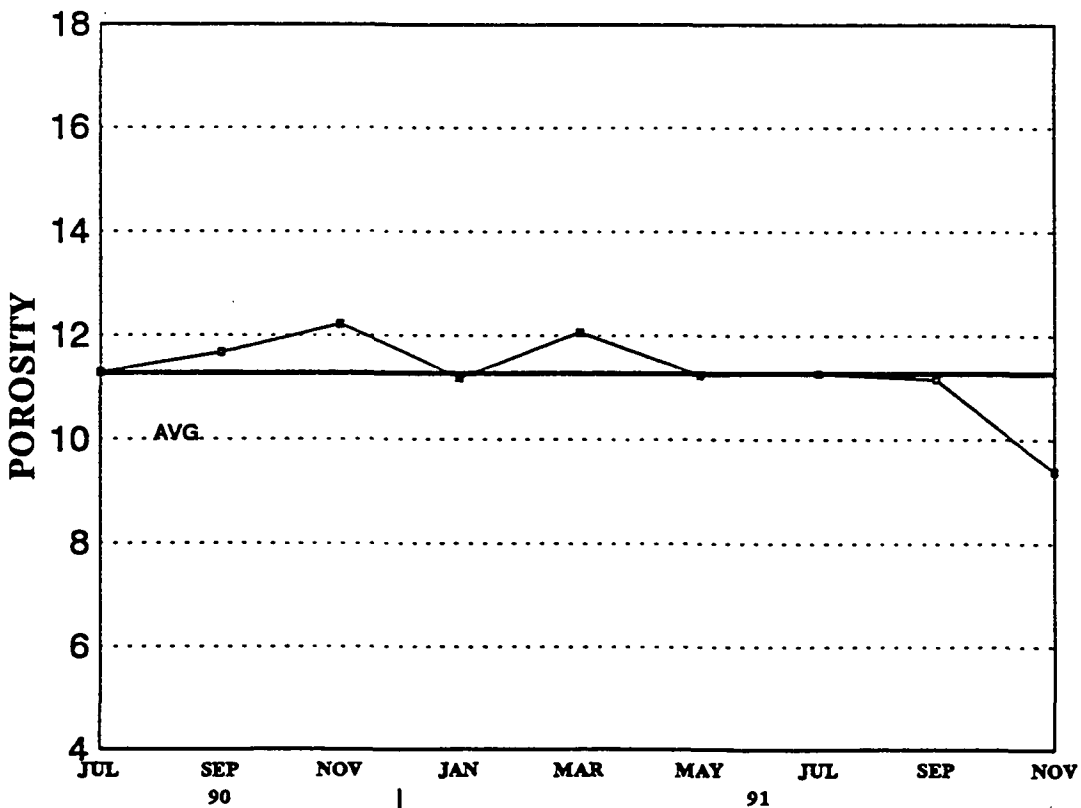
Note: S.D. is Standard Deviation of current machine averages.

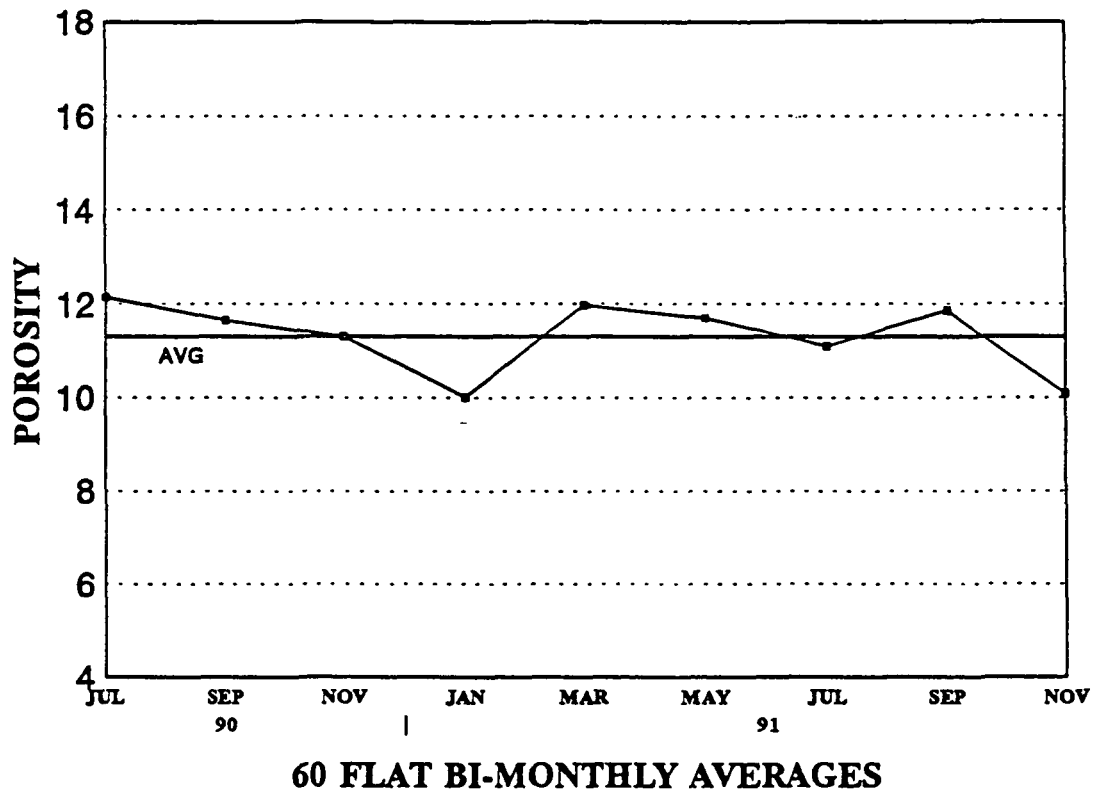
AVG is current KPPD average no. of machines is indicated in ().

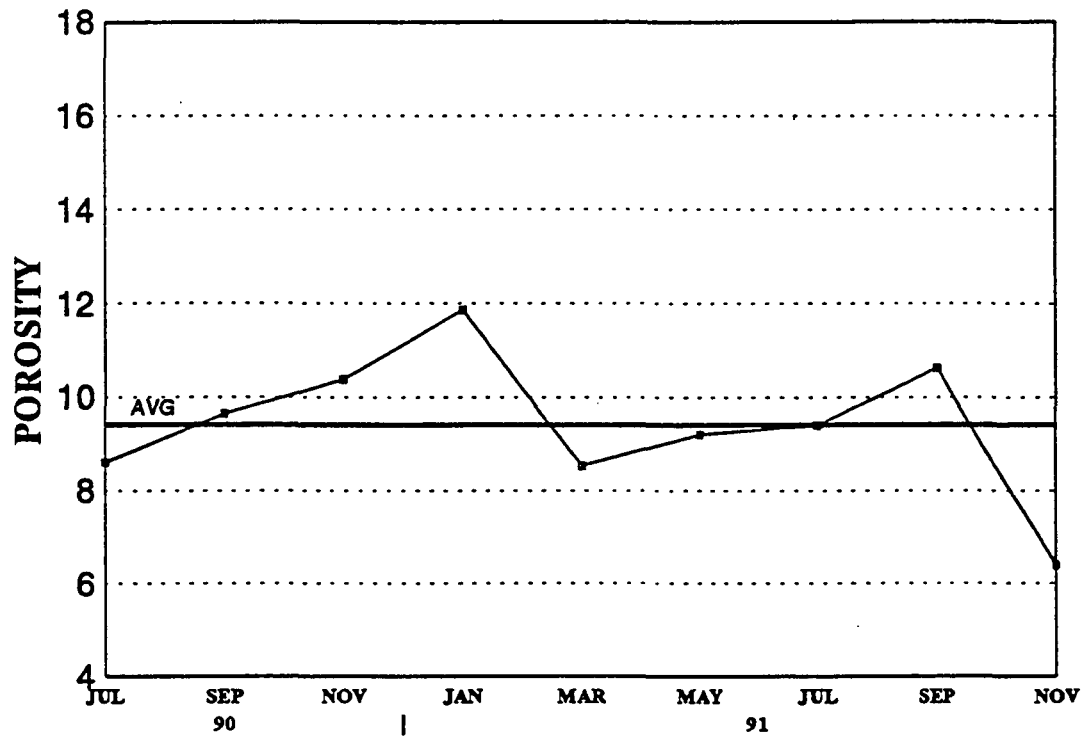
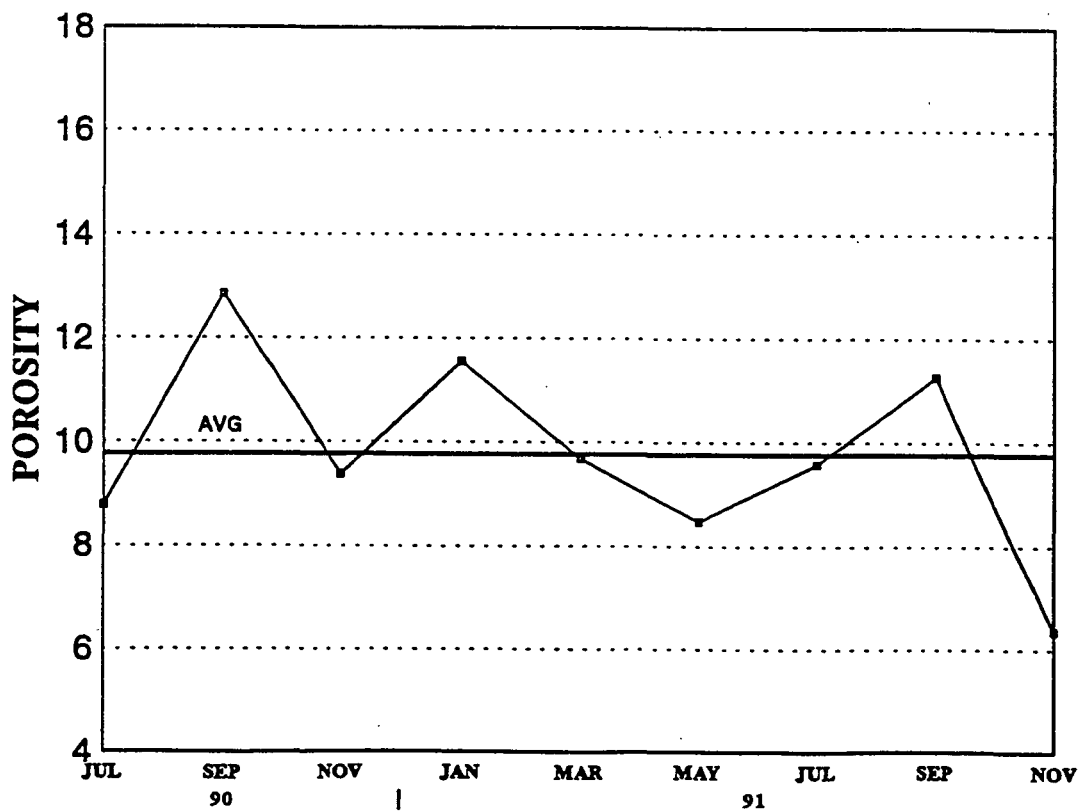
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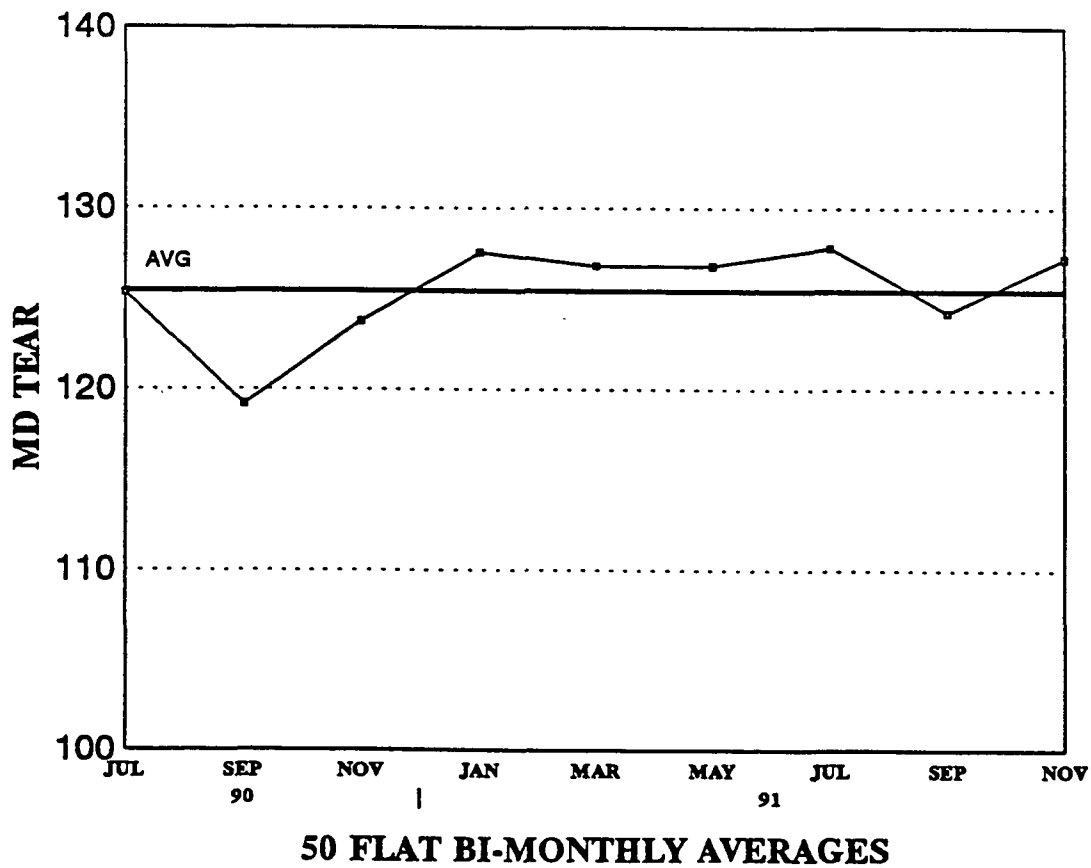
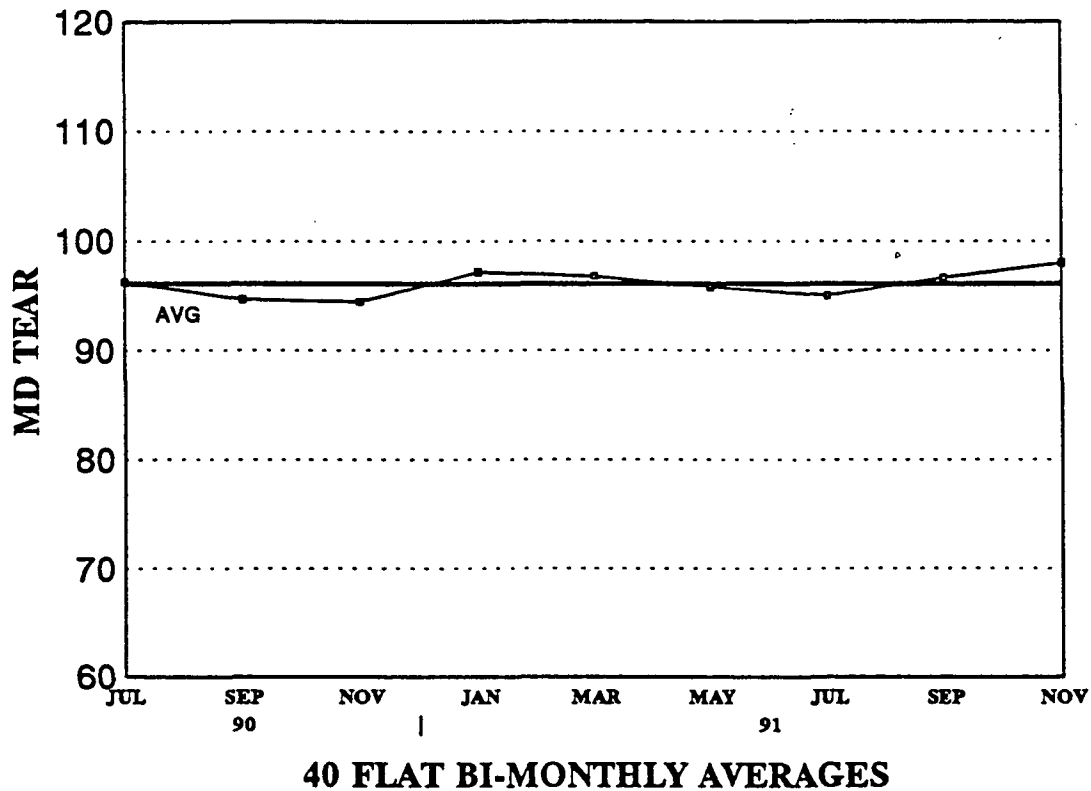
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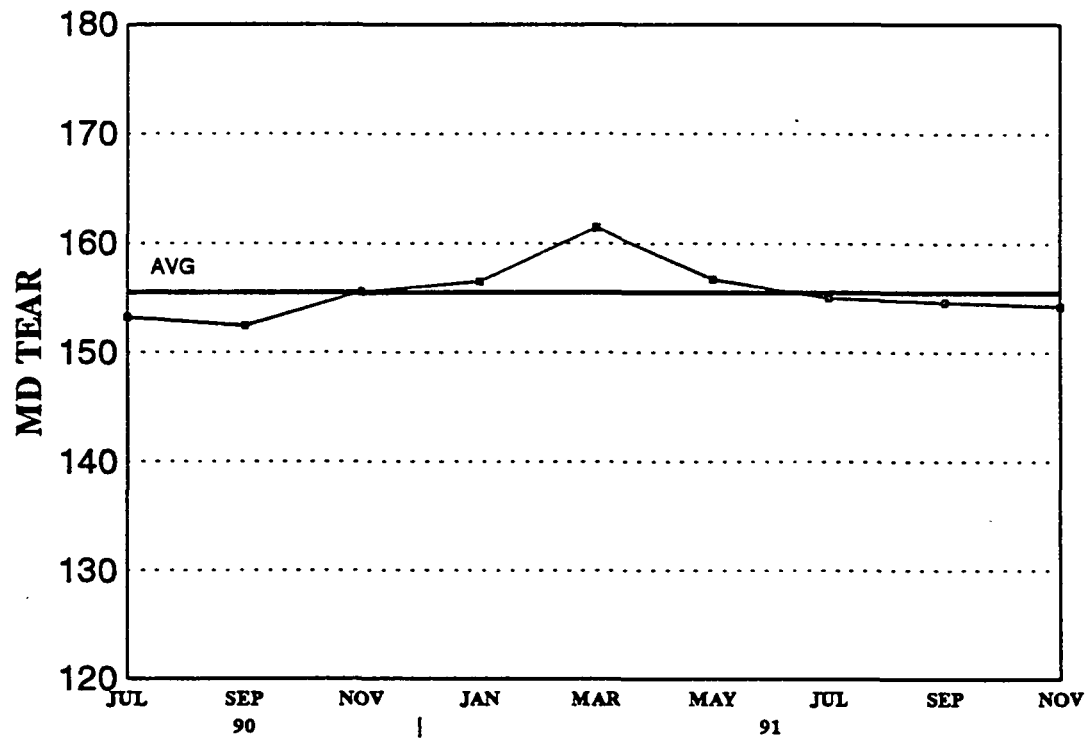
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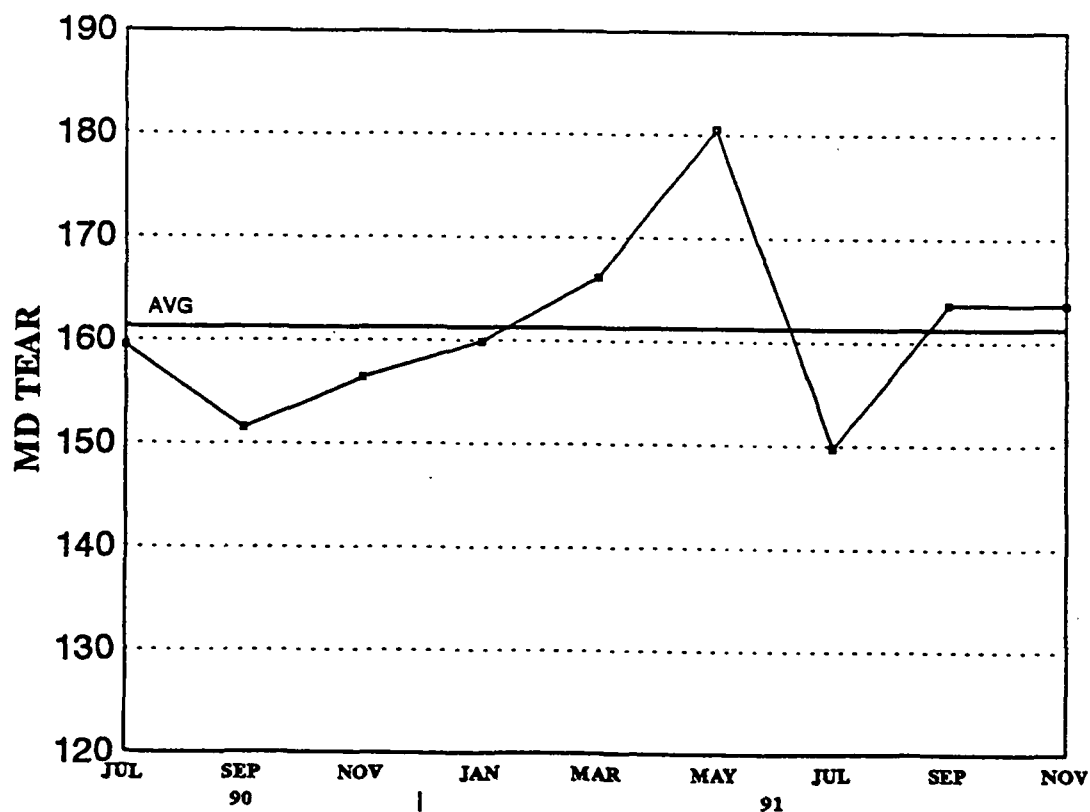
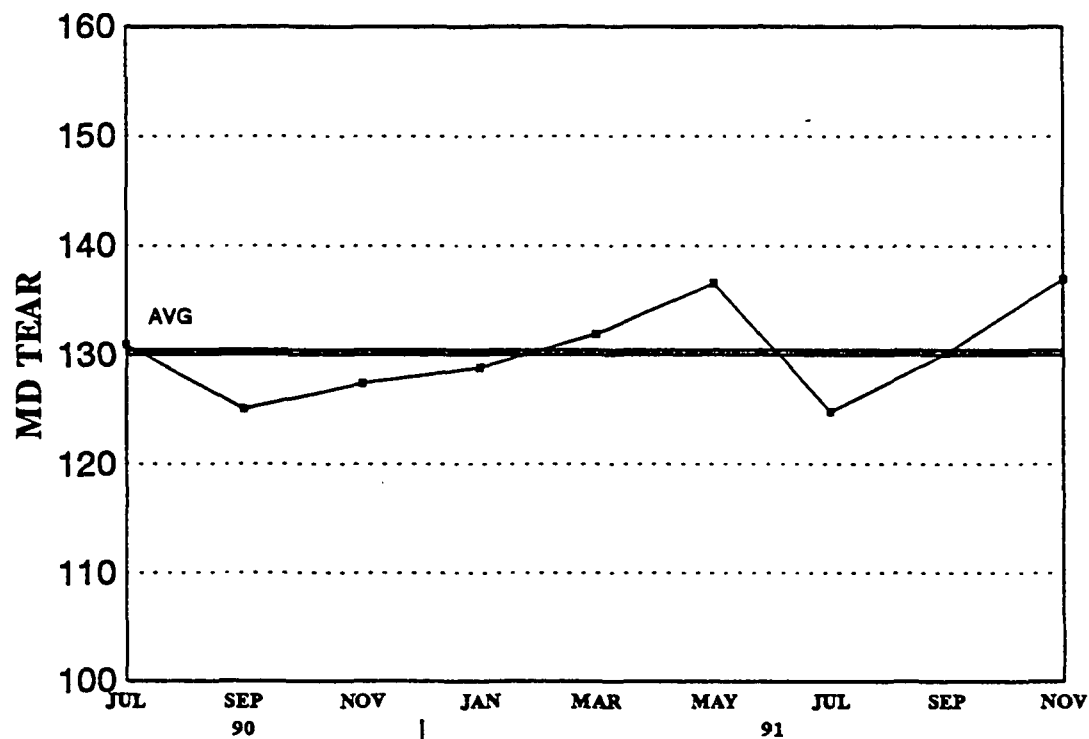
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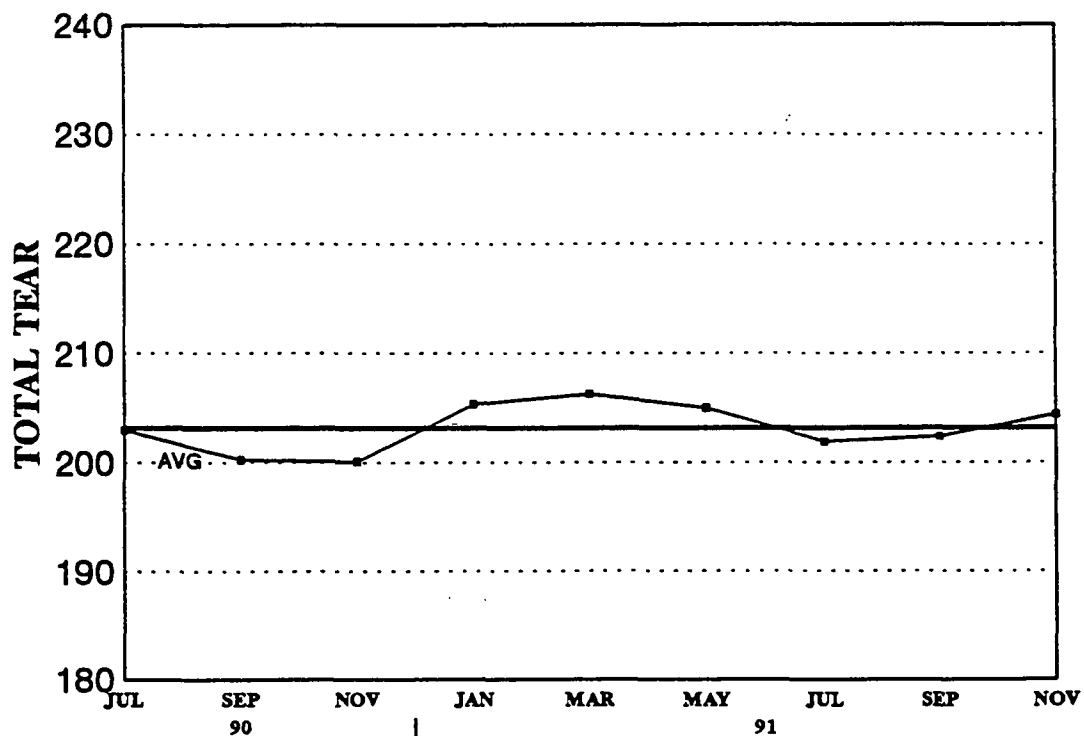
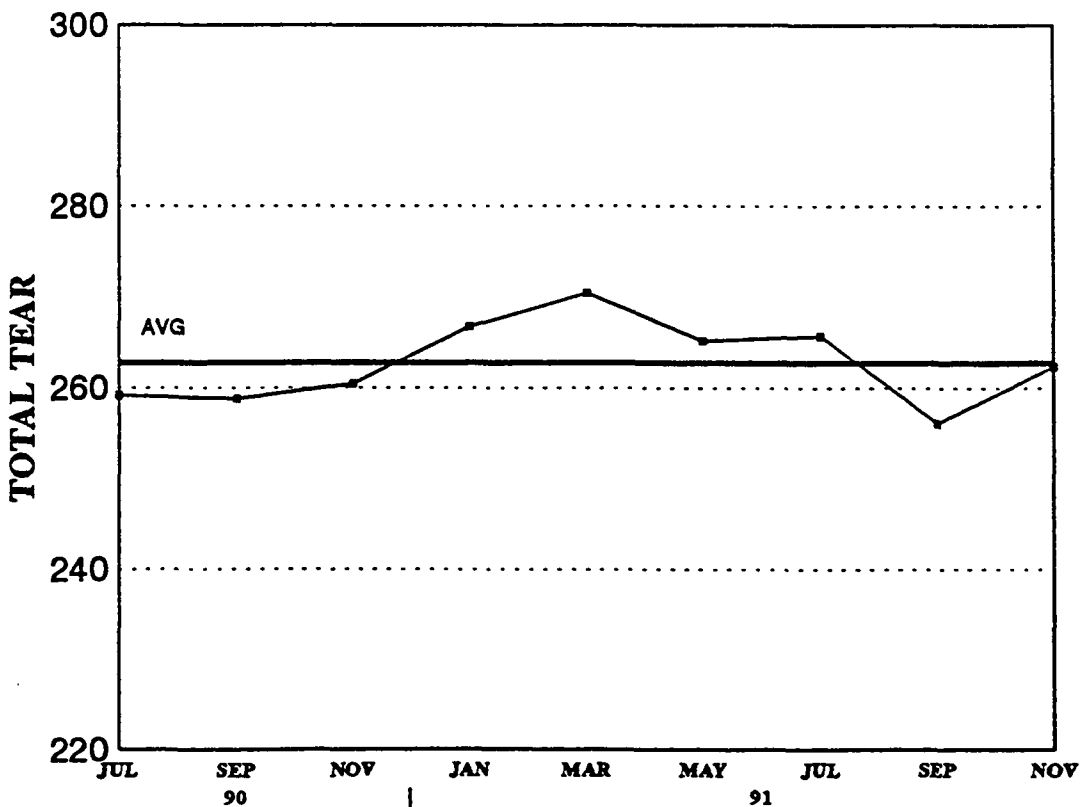
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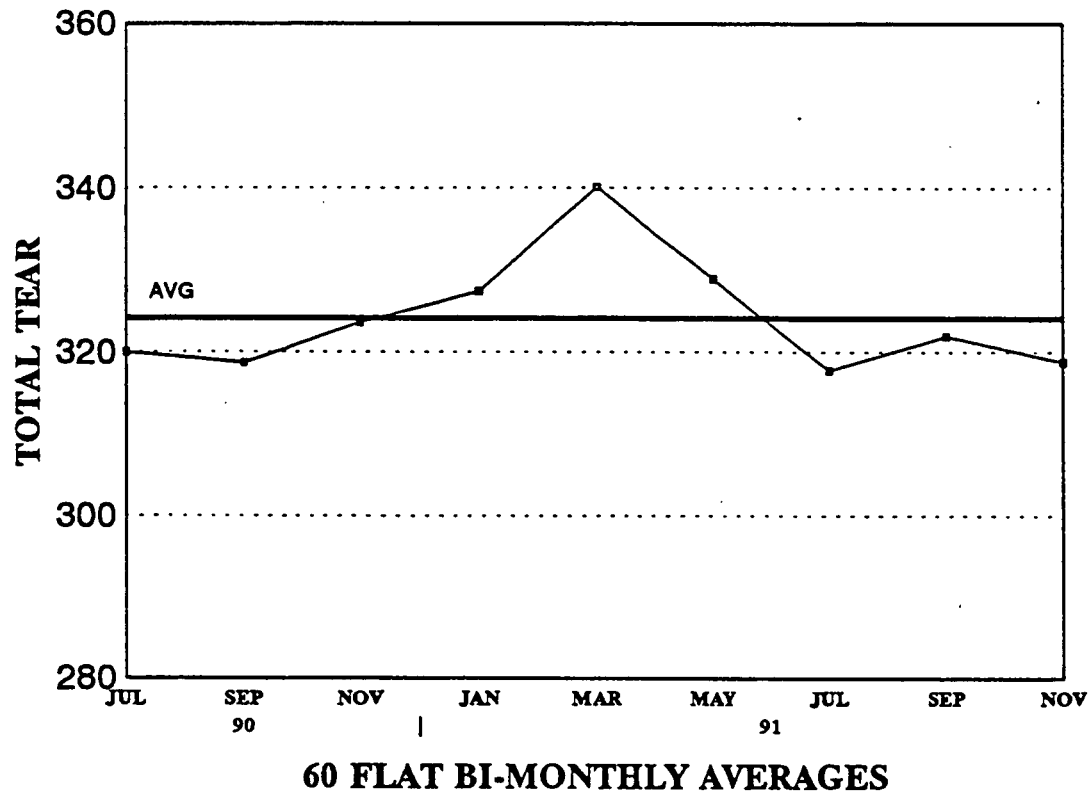
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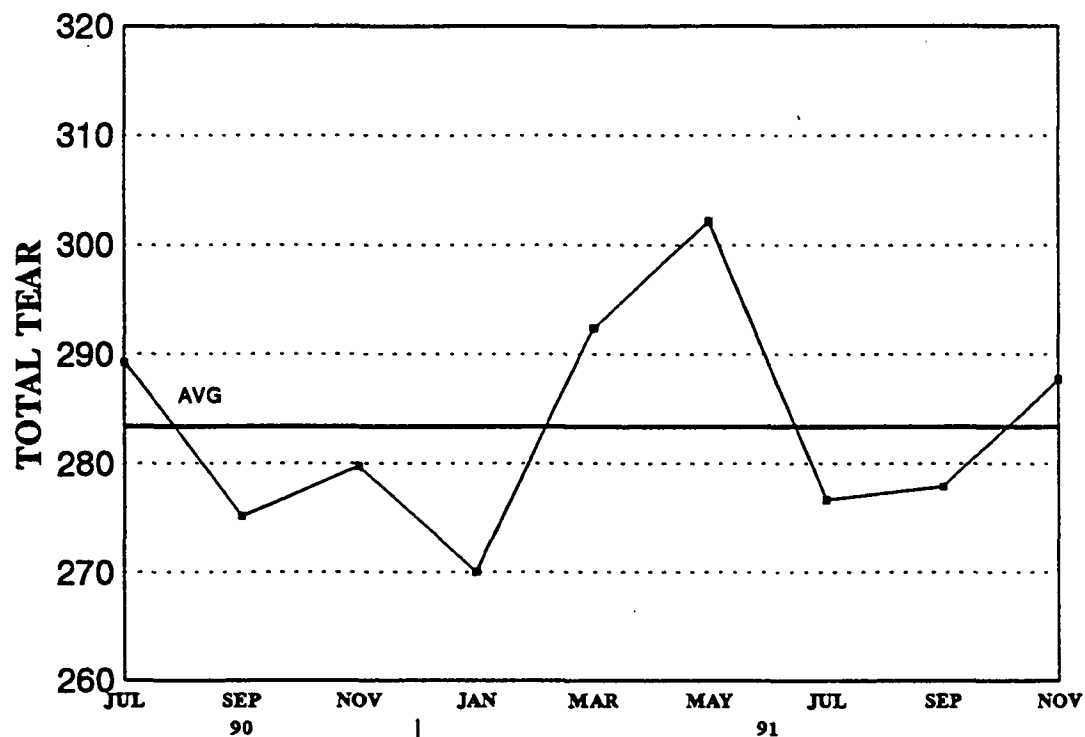
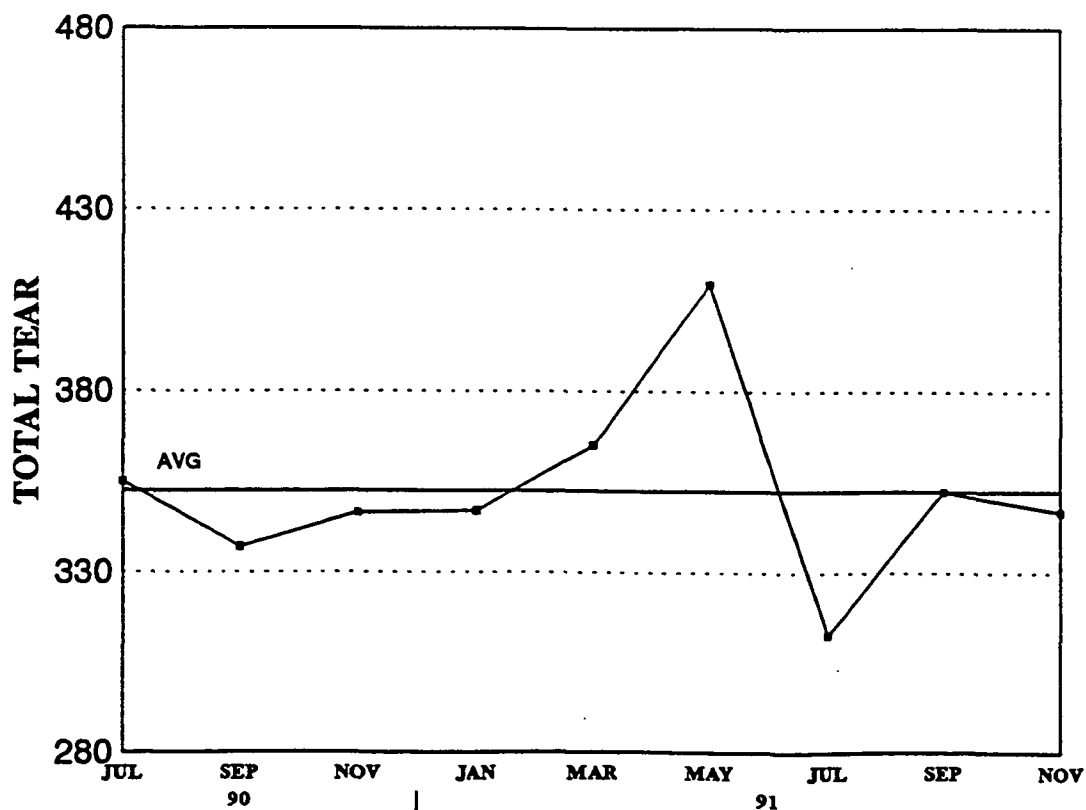
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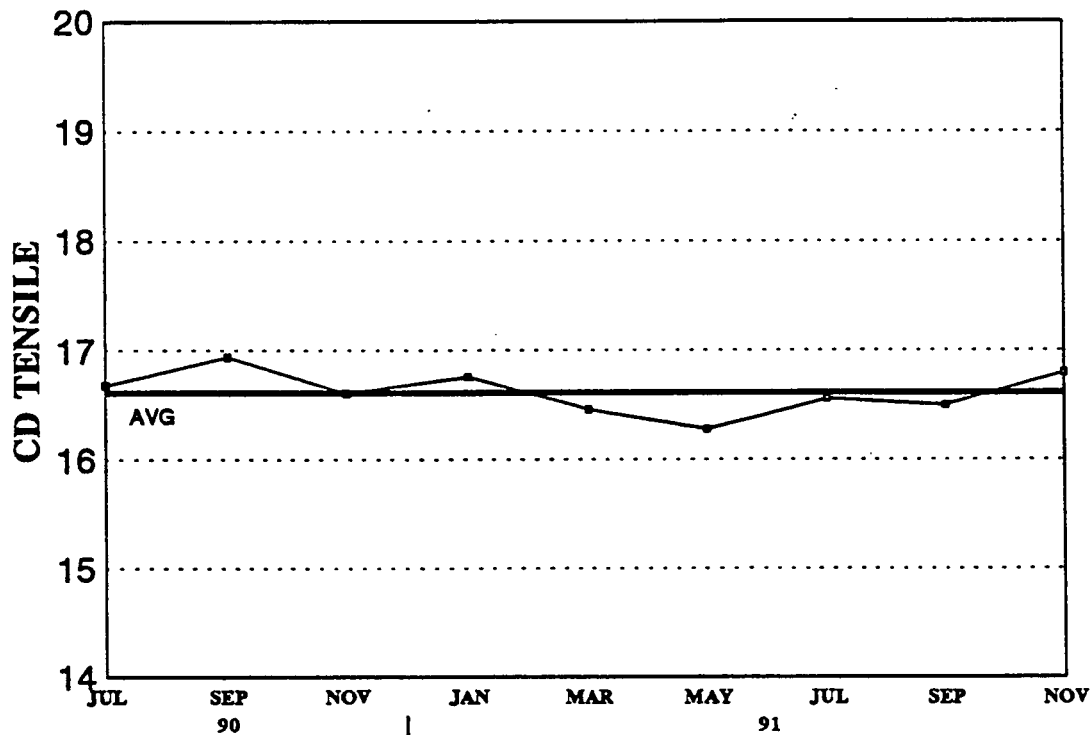
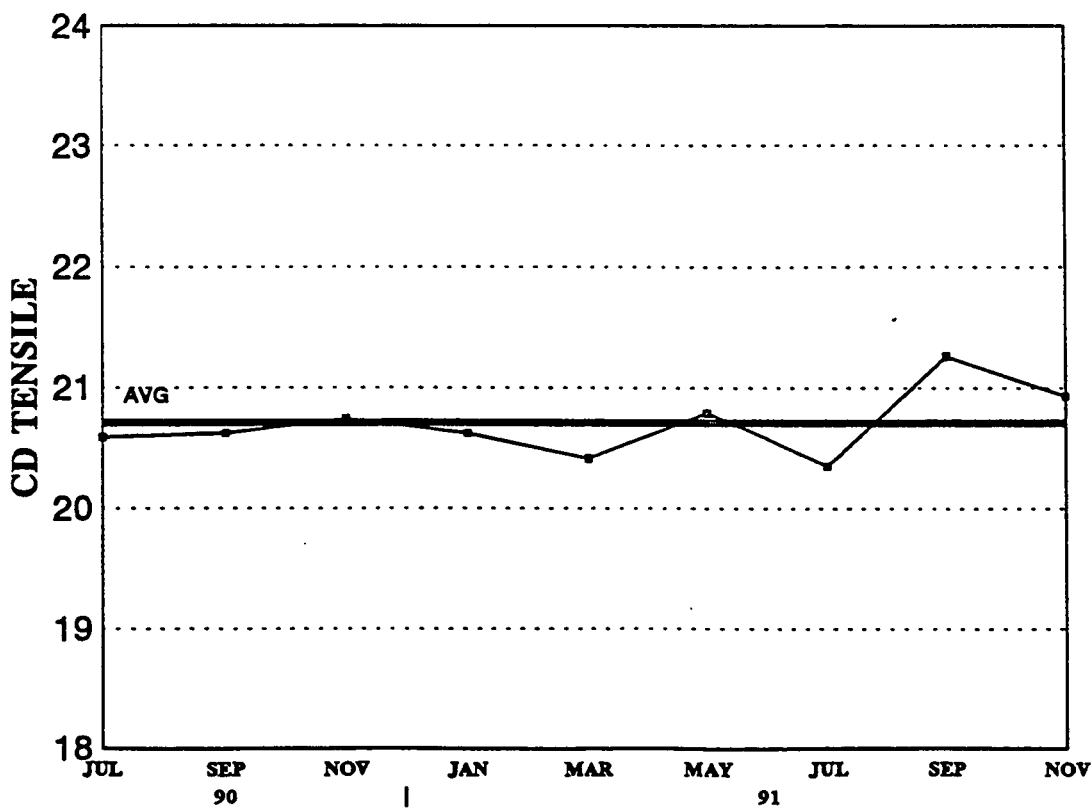
1.5 YEAR TREND PLOT FOR MD TEAR**60 FLAT BI-MONTHLY AVERAGES**

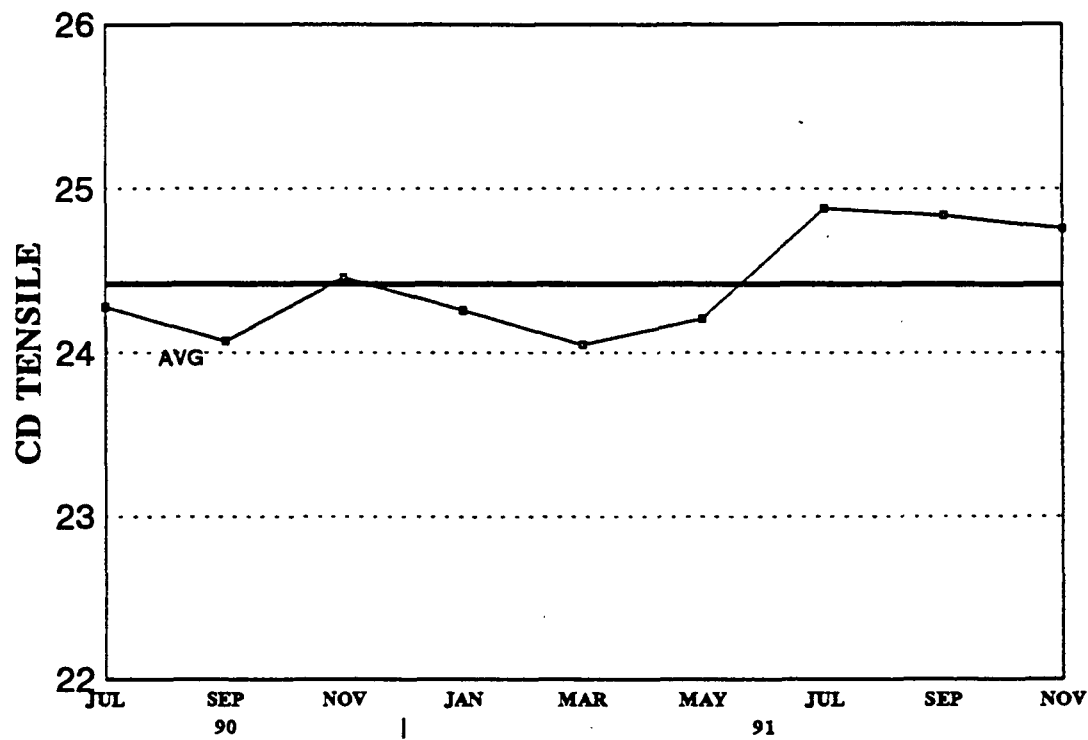
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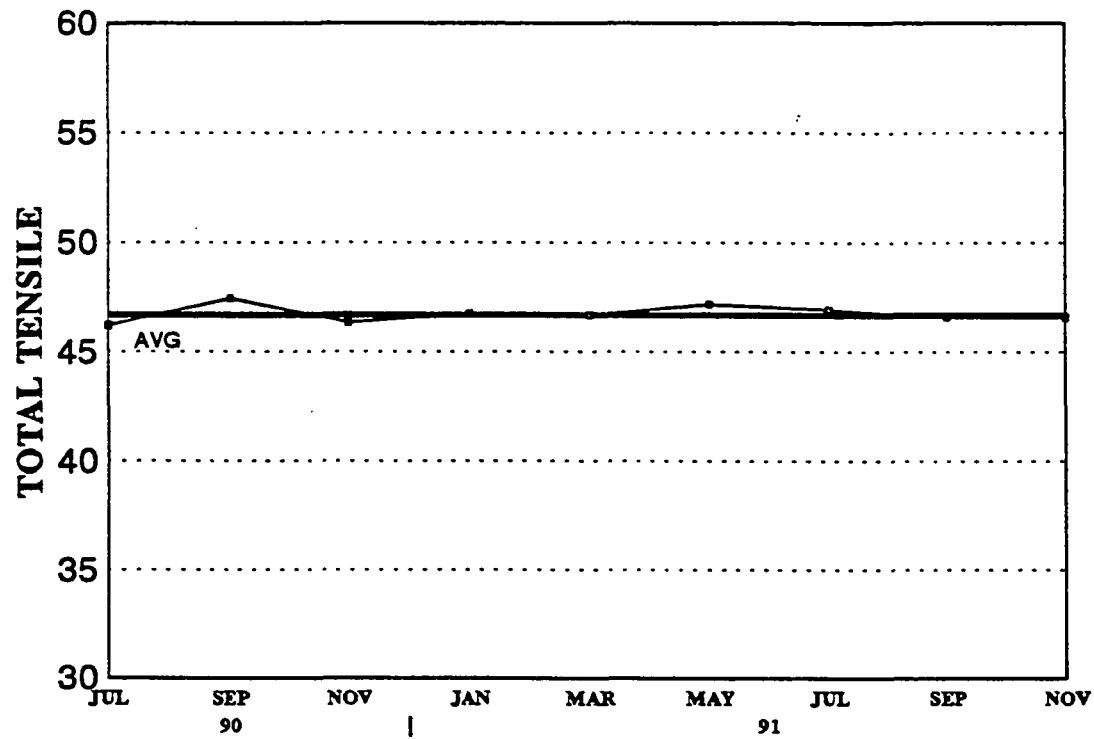
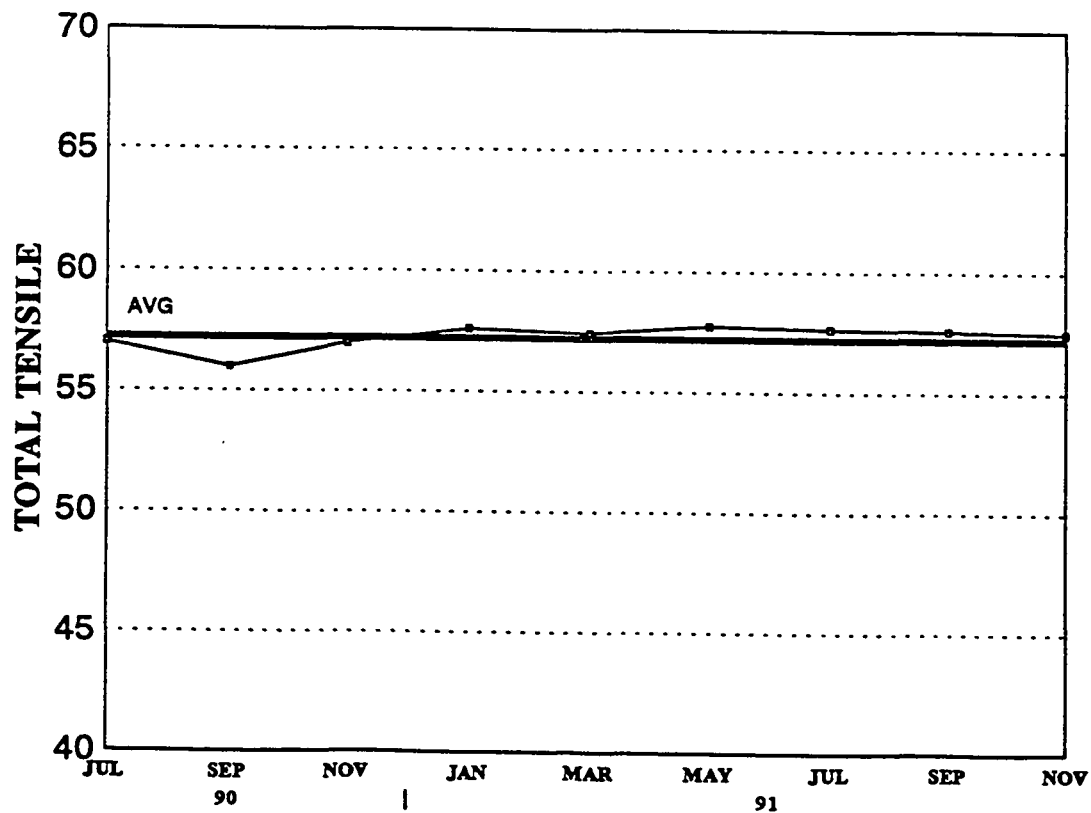
1.5 YEAR TREND PLOT FOR TOTAL TEAR**40 FLAT BI-MONTHLY AVERAGES****50 FLAT BI-MONTHLY AVERAGES**

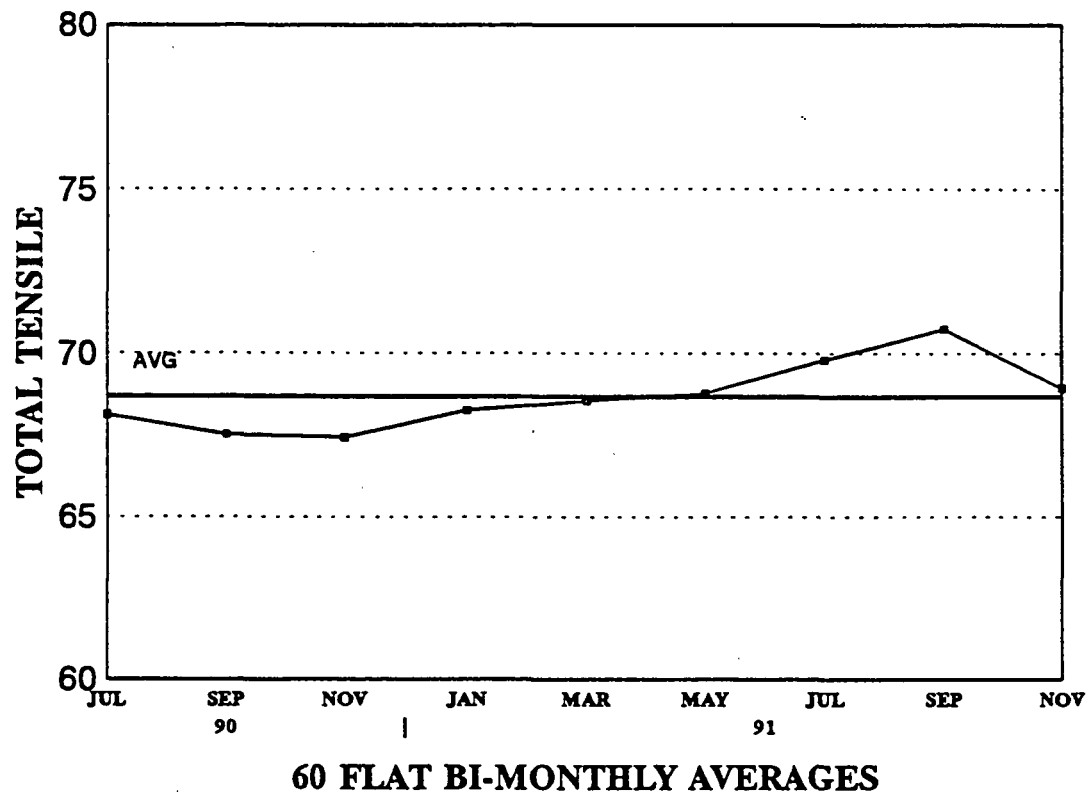
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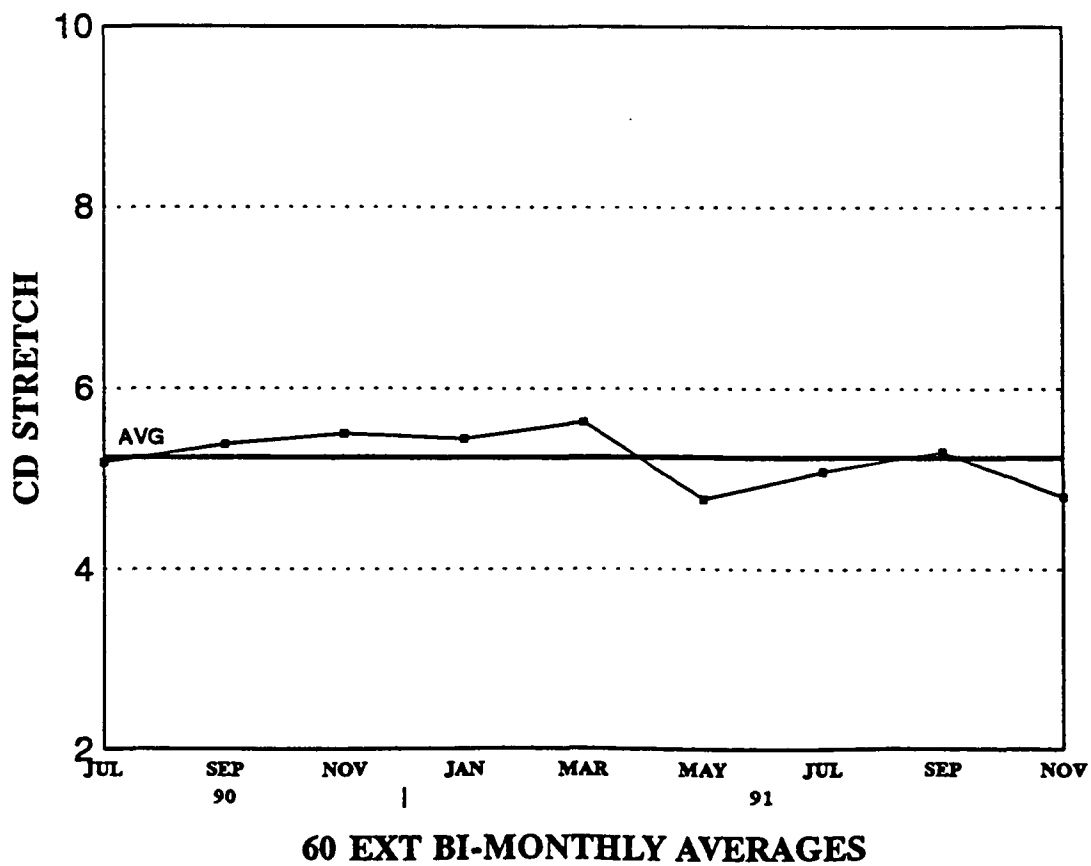
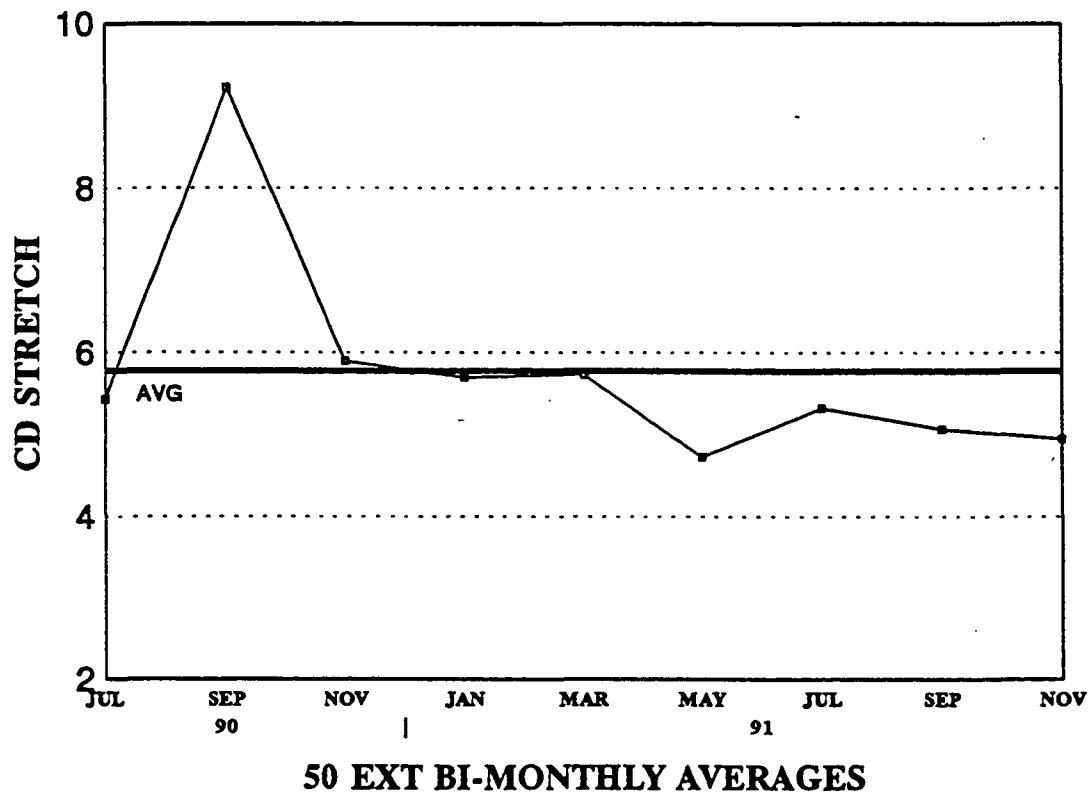
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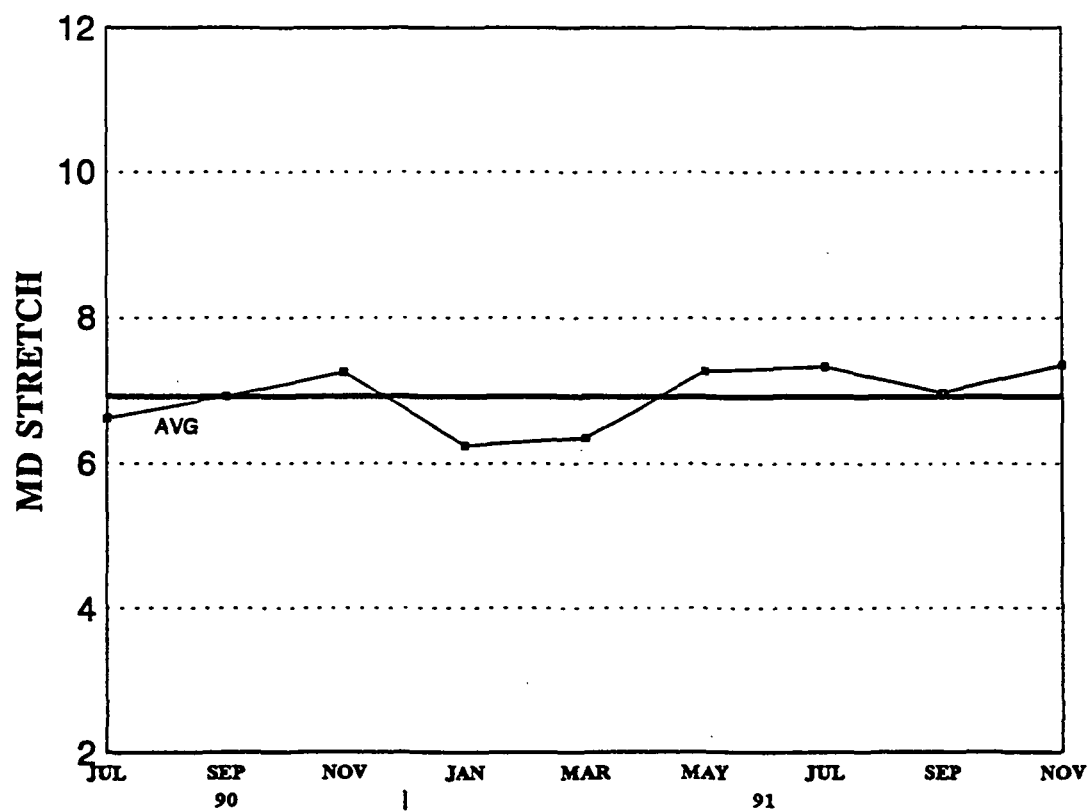
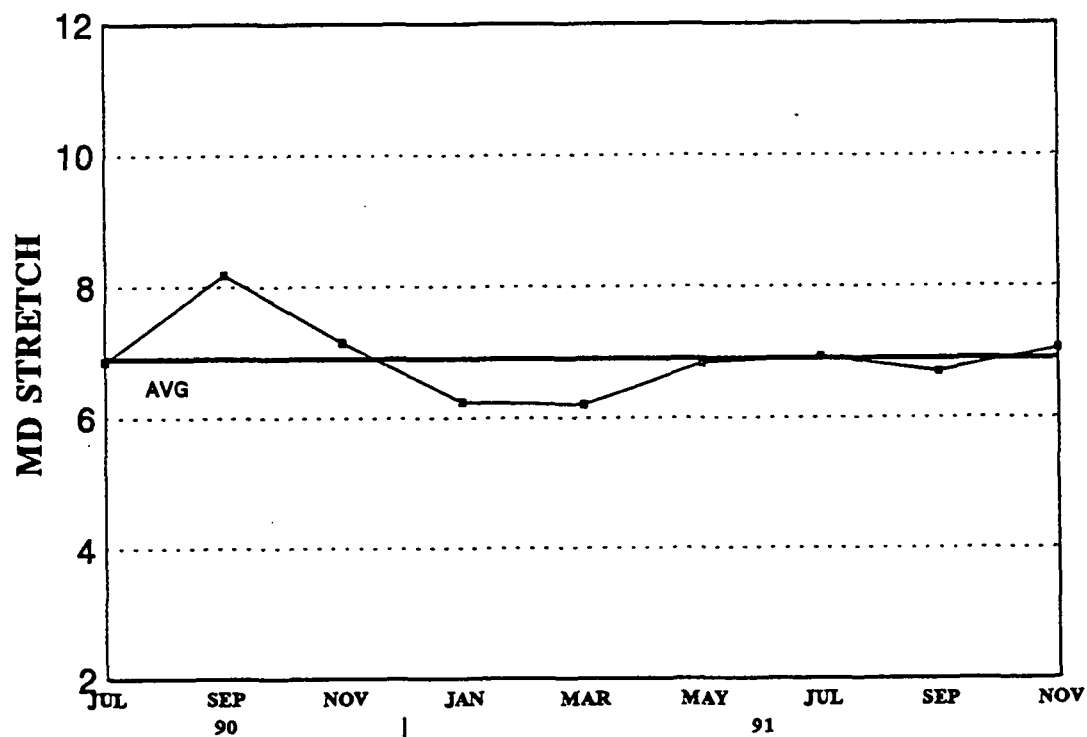
1.5 YEAR TREND PLOT FOR CD TENSILE**40 FLAT BI-MONTHLY AVERAGES****50 FLAT BI-MONTHLY AVERAGES**

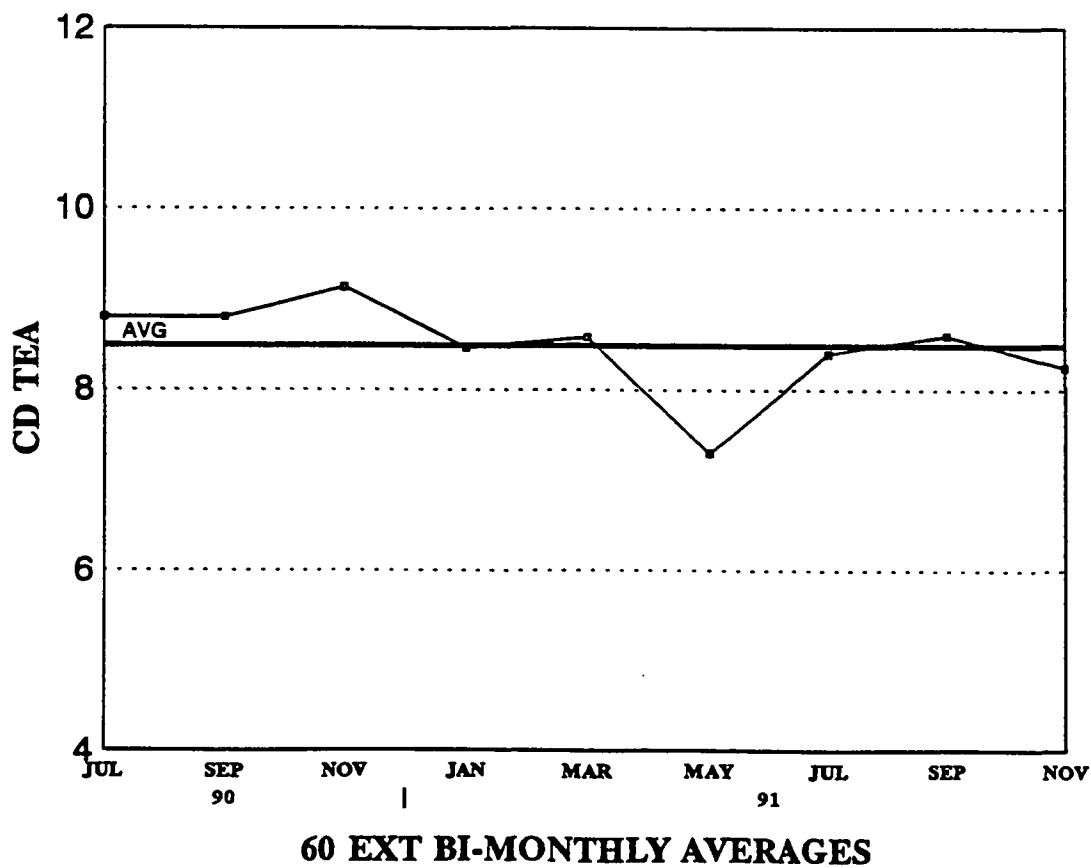
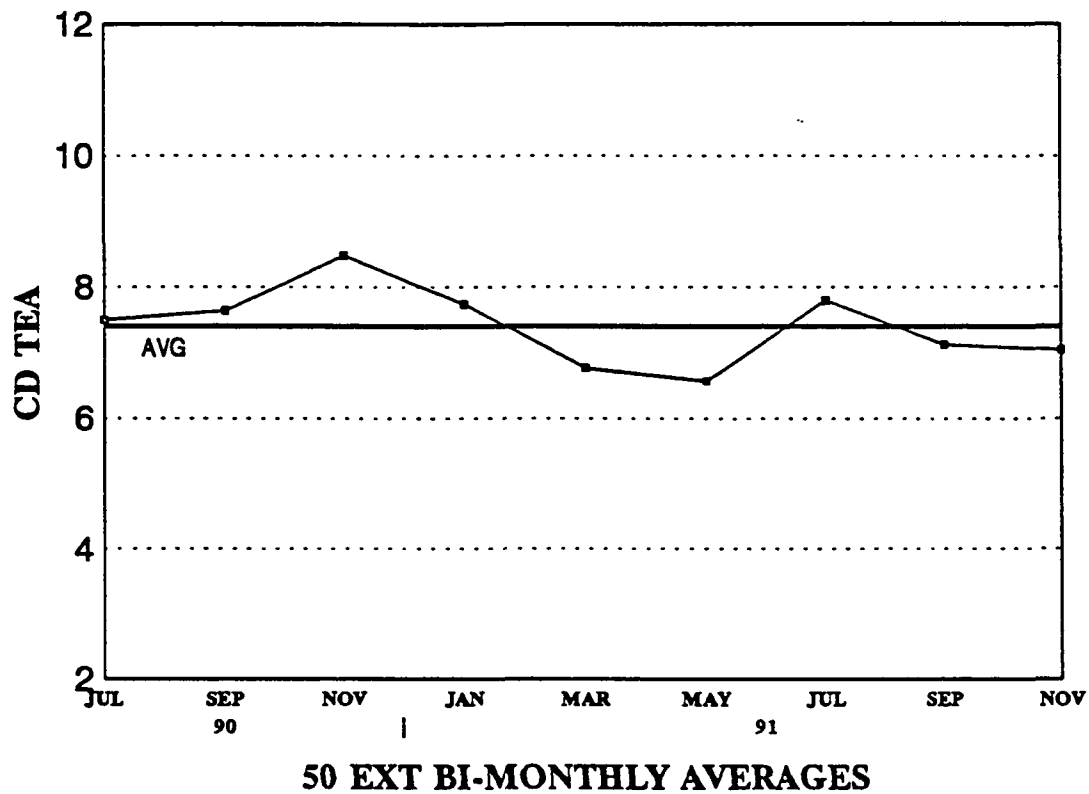
1.5 YEAR TREND PLOT FOR CD TENSILE**60 FLAT BI-MONTHLY AVERAGES**

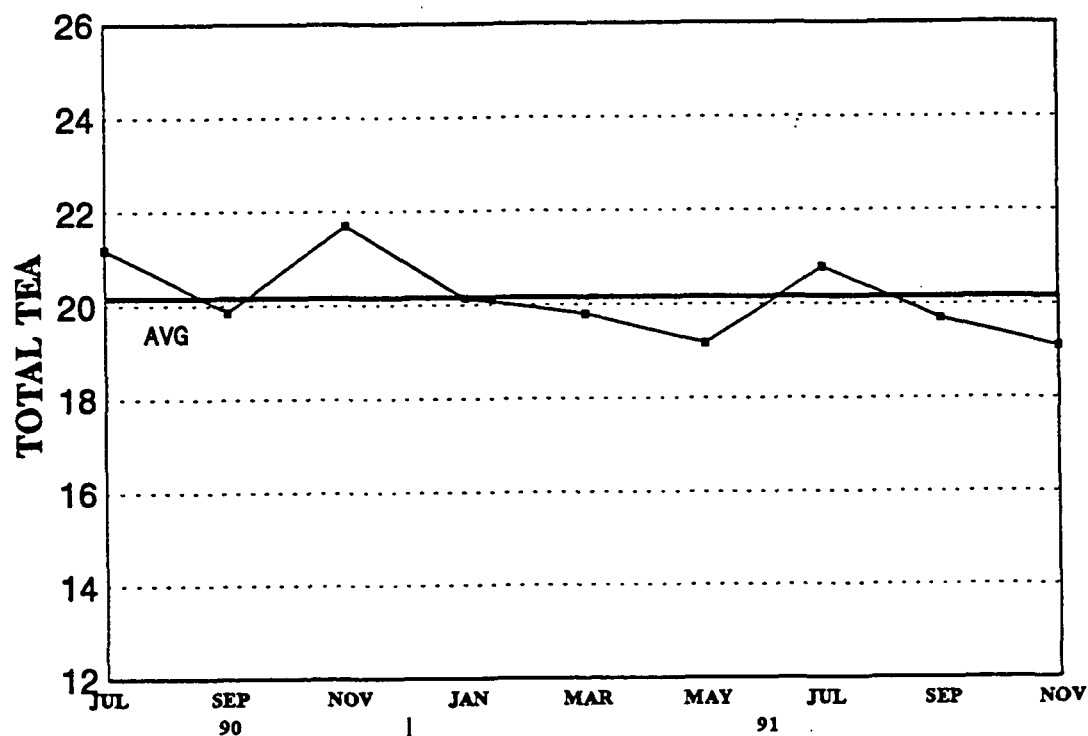
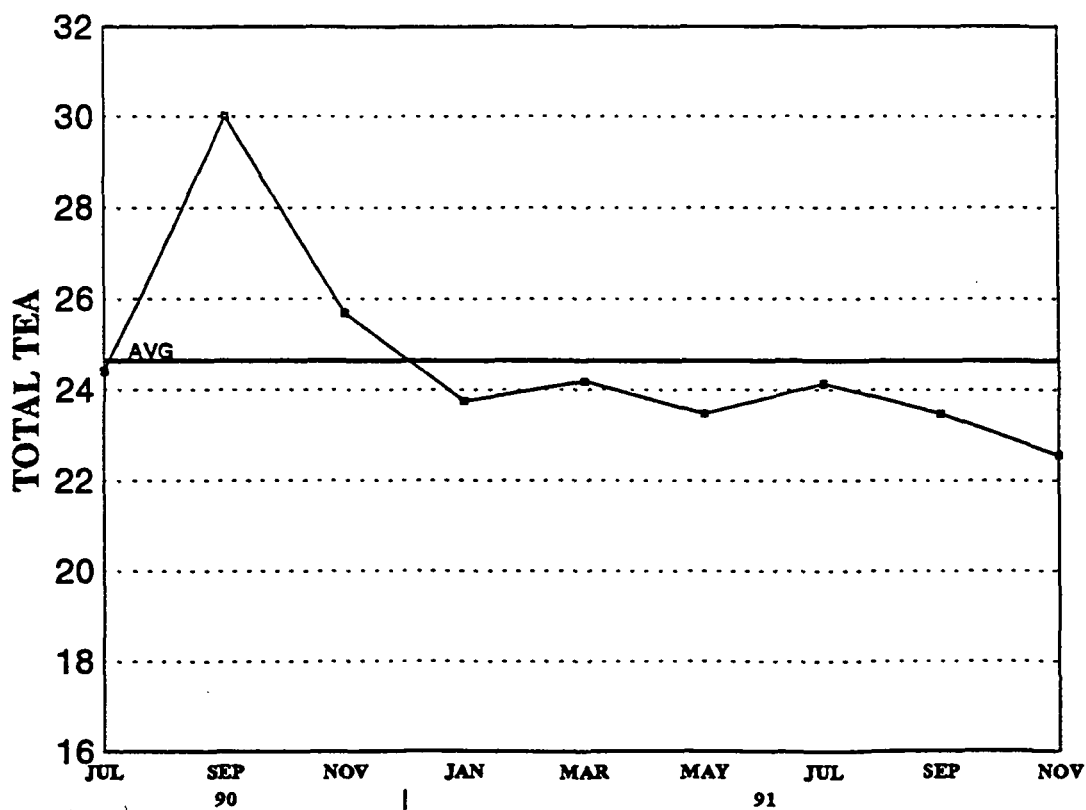
1.5 YEAR TREND PLOT FOR TOTAL TENSILE**40 FLAT BI-MONTHLY AVERAGES****50 FLAT BI-MONTHLY AVERAGES**

1.5 YEAR TREND PLOT FOR TOTAL TENSILE

1.5 YEAR TREND PLOT FOR CD STRETCH

1.5 YEAR TREND PLOT FOR MD STRETCH

1.5 YEAR TREND PLOT FOR CD TEA

1.5 YEAR TREND PLOT FOR TOTAL TEA**50 EXT BI-MONTHLY AVERAGES****60 EXT BI-MONTHLY AVERAGES**

INTRODUCTION

The continuous baseline study is a compilation of monthly averages of mill test data obtained routinely on five major grade weights of multiwall bag paper manufactured in the mills of K.P.P.D. members. Data are included for individual machines which produced at least 50 tons of one or more of the following three major grade weights during a given period: 40, 50, and 60 lb flat; or any tonnage of 50 and 60 lb extensible.

The 40 lb extensible was not included in the report due to a minimum requirement of 3 machines reporting data to be added to this report.

Mill data are included for moisture content, basis weight, porosity, MD tear, and total tear for all grades; CD tensile and total tensile for flat grades; and MD stretch, CD stretch, CD TEA, and total TEA for extensible grades.

Participating mills are asked to report reel moisture content, basis weight, and moisture content corresponding to the basis weight measurement (if different from reel moisture). An adjusted basis weight is then calculated corresponding to a moisture content of 7.25% (AD basis). Only the reel moisture content and the adjusted basis weights are included in the report.

The type of tear tester (old or new style) used by each mill is given in Table XVII. For those mills using the new style tester, the reported tear values were adjusted to an estimated result for the old style tester using the following multipliers:

<u>Grade Weight</u>	<u>MD Tear</u>	<u>Total Tear</u>
Flat Grades	1.063	1.064
Extensible Grades	1.062	1.058

The type of tensile tester (T404 or T494) used by each mill is also given in Table XVII. For those mills using the tester described in T494, the reported tensile values were adjusted to an estimated T404 result using the following multipliers:

<u>Grade Weight</u>	<u>CD Tensile</u>	<u>Total Tensile</u>
Flat Grades	0.996	1.015
Extensible Grades	1.019	1.025

The above multipliers are based on data in Report One of Project 3679, (To be published).

PRESENTATION OF DATA

For the five major grade weights of multiwall bag paper referred to earlier, mill test averages for reel moisture content, adjusted basis weight, porosity, MD tear, and total tear for all grades; CD tensile and total tensile for flat grades; and MD stretch, CD stretch, CD TEA, and total TEA for extensible grades are compiled in the following tables:

<u>Table Number</u>	<u>Description</u>
I-II-III	Mill Data on 40 lb Flat Multiwall Bag
IV-V-VI	Mill Data on 50 lb Flat Multiwall Bag
VII-VIII-IX	Mill Data on 60 lb Flat Multiwall Bag
X-XI-XII	Mill Data on 50 lb Extensible Multiwall Bag
XIII-XIV-XV	Mill Data on 60 lb Extensible Multiwall Bag

Data submitted by the participating mills relative to conditioning and testing environments are summarized in Table XVI. Data submitted relative to tear and tensile variables are summarized in Table XVII.

The procedures used in calculating adjusted basis weight, cumulative machine averages, machine indexes, and K.P.P.D. indexes are described in the appendix.

Table I

Averages of Mill Quality Data for Jul–Aug 1991
40 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	5.9	5.6	110.3	41.1	41.1	96.2	5.2	6.5	48.1
103	4.1	4.0	76.6	45.3	44.2	106.0	4.0	5.8	37.0
104	5.5	5.5	102.8	41.2	41.9	96.4	7.6	7.9	70.2
105	6.1	6.0	114.0	42.7	43.1	99.9	13.3	13.0	122.9
107	5.8	5.7	108.4	43.1	43.6	100.8	10.0	9.5	92.4
108		4.9			41.5			16.0	
110	4.7	4.5	87.9	42.9	44.2	100.4	12.8	13.1	118.3
112	5.9	5.7	110.3	43.0	43.5	100.6	11.5	7.2	106.3
114	5.4	5.4	100.9	44.3	44.1	103.6	6.1	7.6	56.4
117	6.3	6.2	117.8	40.1	40.2	93.8	16.0	21.6	147.9

KPPD 5.5 5.4 103.2 42.6 42.7 99.8 9.6 10.8 88.8

Notes A and B are given in the appendix.

Table I (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
40 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	94.6	97.5	98.9	202.2	205.5	99.7
103	95.1	94.4	99.4	197.4	197.5	97.3
104	95.7	95.7	100.1	206.4	204.3	101.8
105	87.2	90.7	91.2	201.1	204.6	99.2
107	95.1	93.3	99.4	194.2	191.0	95.8
108		94.6			192.5	
110	99.4	98.6	103.9	207.9	209.7	102.5
112	103.9	107.1	108.6	210.9	219.9	104.0
114	91.3	93.9	95.5	201.3	208.2	99.3
117	93.0	90.6	97.2	196.0	194.6	96.7

KPPD 95.0 95.6 99.4 201.9 202.8 99.6

Notes A and B are given in the appendix.

Table I (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
40 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	17.6	17.2	105.5	45.6	44.4	97.3
103	15.4	15.7	92.3	44.9	45.7	95.8
104	16.4	17.0	98.3	49.3	48.5	105.2
105	17.8	16.5	106.7	51.5	50.1	109.9
107	17.2	17.9	103.1	45.6	46.1	97.3
108		17.7			47.2	
110	17.3	17.0	103.7	46.7	47.0	99.7
112	15.8	16.5	94.7	45.0	46.2	96.0
114	15.1	15.5	90.5	50.3	48.2	107.3
117	16.4	15.8	98.3	43.6	45.2	93.0

KPPD 16.6 16.7 99.3 46.9 46.9 100.2

Notes A and B are given in the appendix.

Table II

Averages of Mill Quality Data for Sept–Oct 1991
40 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.0	5.7	109.9	41.5	41.1	97.8	4.2	5.9	39.1
102	6.6	6.6	120.9	40.3	40.3	94.9	13.0	13.0	121.0
103	4.4	4.0	80.6	43.9	44.5	103.4	7.0	5.6	65.2
104	5.4	5.5	98.9	41.3	41.8	97.3	6.5	7.5	60.5
105		6.1			43.1			12.6	
107	6.0	5.7	109.9	43.5	43.4	102.5	10.5	9.5	97.8
108		4.9			41.2			16.7	
110	4.6	4.6	84.3	42.0	43.8	98.9	12.8	13.1	119.2
112	5.7	5.8	104.4	42.8	43.3	100.8	9.4	7.8	87.5
114	5.7	5.4	104.4	44.7	44.0	105.3	8.2	7.7	76.3
116	5.0	5.0	91.6	42.7	42.7	100.6	9.0	9.0	83.8
117	6.0	6.2	109.9	40.2	40.2	94.7	18.0	20.5	167.6

KPPD 5.5 5.5 101.5 42.3 42.5 99.6 9.9 10.7 91.8

Notes A and B are given in the appendix.

Table II (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
40 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	97.4	97.3	100.9	207.9	205.9	102.1
102	104.0	104.0	107.8	218.0	218.0	107.0
103	88.2	94.2	91.4	187.3	197.7	92.0
104	96.7	96.4	100.2	203.2	206.2	99.8
105		91.2			205.3	
107	94.1	92.8	97.5	193.1	190.5	94.8
108		93.7			190.7	
110	106.9	100.1	110.8	217.3	211.0	106.7
112	97.2	105.4	100.7	198.6	216.8	97.5
114	91.2	92.5	94.5	203.2	206.8	99.8
116	99.9	99.9	103.5	203.2	203.2	99.8
117	91.0	90.5	94.3	192.0	191.9	94.3

KPPD 96.7 96.5 100.2 202.4 203.7 99.4

Notes A and B are given in the appendix.

Table II (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
40 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	lb/in	lb/in		lb/in	lb/in	
	Av.	Av.	*B	Av.	Av.	*B
100	16.2	16.9	98.3	42.1	44.0	90.3
102	15.9	15.9	96.5	46.7	46.7	100.1
103	17.8	16.0	108.0	53.1	46.7	113.9
104	16.7	16.7	101.4	47.6	48.3	102.1
105		16.5			50.1	
107	17.6	17.8	106.8	45.1	46.0	96.7
108		17.8			47.2	
110	18.0	17.2	109.3	45.7	46.9	98.0
112	16.2	16.3	98.3	44.7	46.0	95.9
114	14.8	15.5	89.8	51.3	48.6	110.0
116	14.9	14.9	90.4	43.8	43.8	93.9
117	16.9	16.2	102.6	45.7	45.3	98.0

KPPD 16.5 16.5 100.2 46.6 46.6 99.9

Notes A and B are given in the appendix.

Table III

Averages of Mill Quality Data for Nov-Dec 1991
40 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.0	5.9	108.9	41.3	38.8	97.9	7.6	5.9	71.5
102		6.6			40.3			13.0	
103	4.1	4.2	74.4	43.8	44.7	103.9	5.0	5.3	47.1
104		5.4			41.6			7.4	
105		6.1			42.9			12.4	
107	6.3	5.9	114.4	44.8	43.6	106.2	7.5	9.3	70.6
108		4.9			40.9			19.0	
110	4.7	4.6	85.3	43.6	43.3	103.4	10.8	12.6	101.6
112		5.8			43.2			8.4	
114	5.7	5.6	103.5	44.0	44.1	104.3	5.7	7.6	53.6
116	4.4	4.8	79.9	42.4	42.6	100.5	5.0	7.7	47.1
117	7.0	6.3	127.1	39.7	40.1	94.1	14.5	18.9	136.5

KPPD 5.5 5.5 99.1 42.8 42.2 101.5 8.0 10.6 75.4

Notes A and B are given in the appendix.

Table III (Cont)

Averages of Mill Quality Data for Nov–Dec 1991
40 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	99.1	97.5	102.2	206.3	205.8	100.9
102		104.0			218.0	
103	104.2	96.9	107.5	214.4	202.7	104.9
104		97.1			207.9	
105		92.2			208.3	
107	97.3	92.2	100.3	197.9	189.2	96.8
108		94.0			192.0	
110	99.1	101.9	102.2	206.0	212.4	100.8
112		103.6			212.1	
114	90.1	92.2	92.9	195.8	204.5	95.8
116	104.2	101.3	107.5	214.9	207.1	105.2
117	92.0	90.8	94.9	195.5	192.4	95.7

KPPD 98.0 97.0 101.1 204.4 204.4 100.0

Notes A and B are given in the appendix.

Table III (Cont)

Averages of Mill Quality Data for Nov-Dec 1991
40 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	15.7	16.7	95.1	43.0	43.4	91.9
102		15.9			46.7	
103	17.2	16.6	104.2	47.8	47.8	102.2
104		16.4			48.7	
105		16.5			49.5	
107	20.3	18.2	123.0	48.4	46.9	103.5
108		17.8			47.4	
110	17.4	17.4	105.4	45.3	46.4	96.8
112		16.2			45.5	
114	15.5	15.1	93.9	50.5	49.5	107.9
116	14.6	14.8	88.4	43.9	43.9	93.8
117	16.9	16.5	102.4	47.2	45.7	100.9

KPPD 16.8 16.5 101.8 46.6 46.8 99.6

Notes A and B are given in the appendix.

Table IV

Averages of Mill Quality Data for Jul–Aug 1991
50 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.1	5.8	111.5	50.7	51.0	96.0	6.0	6.9	49.4
101		6.1			51.8			10.8	
102		6.5			50.8			25.1	
103	4.5	4.2	82.3	55.7	54.8	105.5	7.0	6.4	57.7
104	5.8	5.8	106.0	50.7	51.9	96.0	7.5	7.1	61.8
105	6.1	6.1	111.5	52.5	52.7	99.5	12.1	13.2	99.7
106	6.0	6.1	109.7	52.5	51.8	99.5	13.0	14.1	107.1
107	6.0	5.8	109.7	52.4	53.2	99.3	9.5	8.8	78.3
108		4.6			52.2			16.5	
109	4.9	4.8	89.6	52.3	54.2	99.1	8.1	7.8	66.7
110	4.9	4.6	89.6	53.3	54.3	101.0	13.1	13.3	107.9
111	6.0	5.9	109.7	54.7	54.2	103.6	25.0	22.1	206.0
112	6.0	6.0	109.7	53.4	53.4	101.2	12.2	8.8	100.5
113		5.6			52.9			6.1	
115	4.4	4.2	80.4	52.8	53.9	100.0	7.0	7.7	57.7
116	5.1	4.7	93.2	53.4	53.9	101.2	9.0	10.0	74.2
117	6.3	6.2	115.2	50.5	50.4	95.7	17.0	21.6	140.1

KPPD 5.5 5.5 101.4 52.7 52.8 99.8 11.3 12.1 92.9

Notes A and B are given in the appendix.

Table IV (Cont)

Averages of Mill Quality Data for Jul—Aug 1991
50 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	125.3	128.7	99.6	263.9	268.9	100.2
101		115.5			246.4	
102		118.2			249.8	
103	120.7	122.6	96.0	247.9	252.3	94.1
104	136.6	130.9	108.6	291.5	277.4	110.7
105	117.5	116.3	93.4	261.7	259.4	99.4
106	125.4	126.3	99.7	259.6	264.2	98.6
107	121.2	116.5	96.4	251.1	244.8	95.3
108		122.4			250.5	
109	136.2	139.5	108.3	277.4	287.4	105.3
110	132.0	124.1	105.0	270.8	275.5	102.8
111	124.6	132.1	99.1	260.0	271.9	98.7
112	129.6	133.0	103.1	266.7	275.8	101.2
113		130.4			271.7	
115	133.9	133.4	106.5	270.3	269.7	102.6
116	140.3	128.6	111.6	283.6	260.2	107.7
117	118.5	119.4	94.2	249.5	252.1	94.7

KPPD 127.8 125.8 101.6 265.7 263.4 100.9

Notes A and B are given in the appendix.

Table IV (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
50 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	20.7	21.3	101.2	56.6	56.4	98.9
101		19.3			53.2	
102		20.8			56.8	
103	21.1	20.1	103.1	59.7	55.2	104.3
104	19.9	20.3	97.3	59.0	57.4	103.1
105	20.1	20.4	98.2	62.7	62.1	109.6
106	21.2	20.4	103.6		57.5	
107	21.7	21.9	106.1	57.6	58.3	100.7
108		21.3			60.1	
109	21.8	20.5	106.6	56.6	55.5	98.9
110	22.1	21.9	108.0	57.7	57.5	100.9
111	19.1	19.4	93.4	60.4	57.7	105.6
112	19.8	20.2	96.8	58.0	58.4	101.4
113		20.8			57.5	
115	18.4	18.8	89.9	53.7	54.2	93.9
116	18.7	19.2	91.4	53.7	56.6	93.9
117	19.9	21.2	97.3	55.8	58.2	97.5

KPPD 20.3 20.5 99.4 57.6 57.2 100.7

Notes A and B are given in the appendix.

Table V

Averages of Mill Quality Data for Sept–Oct 1991
50 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.0	5.9	109.2	51.3	51.1	97.4	5.7	6.7	48.4
101		6.1			51.7			11.0	
102	6.6	6.5	120.1	50.4	50.7	95.7	11.0	22.3	93.4
103	4.5	4.1	81.9	53.6	55.0	101.8	11.0	6.9	93.4
104		5.8			51.8			6.8	
105	6.0	6.1	109.2	52.7	52.7	100.0	12.5	12.9	106.1
106	6.0	6.1	109.2	52.4	52.1	99.5	12.6	13.9	107.0
107	6.2	5.9	112.8	53.3	53.1	101.2	9.5	8.9	80.7
108		4.6			51.9			17.3	
109	4.7	4.8	85.5	51.7	53.7	98.1	10.0	8.0	84.9
110	4.7	4.6	85.5	52.6	53.8	99.9	13.5	13.2	114.6
111	5.9	5.9	107.4	54.9	54.4	104.2	23.5	22.5	199.5
112	6.1	6.0	111.0	53.0	53.3	100.6	10.4	9.1	88.3
113		5.6			52.7			6.1	
114	5.6	5.6	101.9	53.2	53.2	101.0	10.0	10.0	84.9
115	3.8	4.1	69.2	53.1	53.4	100.8	6.0	7.7	50.9
116	4.8	5.0	87.4	53.0	53.2	100.6	7.5	8.8	63.7
117	6.2	6.2	112.8	50.5	50.4	95.9	13.0	19.9	110.4

KPPD 5.5 5.5 100.2 52.6 52.7 99.8 11.2 11.8 94.7

Notes A and B are given in the appendix.

Table V (Cont)

Averages of Mill Quality Data for Sept-Oct 1991
50 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	126.1	127.6	100.7	264.9	268.4	101.0
101		115.5			246.3	
102	116.0	117.8	92.6	241.0	247.8	91.9
103	118.0	122.5	94.2	241.5	251.8	92.1
104		132.8			282.6	
105	108.4	115.2	86.6	239.4	256.8	91.3
106	122.2	126.3	97.6	256.4	263.8	97.7
107	122.2	116.8	97.6	251.1	244.9	95.7
108		122.5			250.8	
109	143.4	139.7	114.5	284.6	286.6	108.5
110	134.8	124.3	107.7	274.2	275.4	104.5
111	126.3	130.6	100.9	263.1	269.7	100.3
112	126.9	131.8	101.4	262.8	273.2	100.2
113		129.2			269.4	
114	118.0	118.0	94.2	251.5	251.5	95.9
115	127.0	131.4	101.4	253.2	266.1	96.5
116	129.2	132.0	103.2	260.1	267.4	99.1
117	121.0	119.7	96.6	241.0	249.9	91.9

KPPD 124.3 125.2 99.2 256.1 262.4 97.6

Notes A and B are given in the appendix.

Table V (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
50 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	20.5	21.0	99.9	56.1	56.3	97.6
101		19.2			53.2	
102	21.4	21.0	104.3	56.8	56.8	98.8
103	21.7	20.4	105.7	63.6	56.3	110.7
104		19.9			57.4	
105	21.9	20.7	106.7	63.9	62.4	111.2
106	21.9	20.8	106.7	62.3	58.3	108.4
107	22.4	22.0	109.1	57.3	58.2	99.7
108		21.1			60.1	
109	22.1	20.7	107.7	56.8	55.7	98.8
110	22.6	22.2	110.1	56.9	57.4	99.0
111	19.3	19.4	94.0	58.4	57.9	101.6
112	19.6	20.1	95.5	58.6	58.5	102.0
113		20.9			57.5	
114	20.2	20.2	98.4	62.2	62.2	108.2
115	19.6	19.0	95.5	41.3	52.0	71.9
116	19.5	18.9	95.0	55.1	56.3	95.9
117	24.9	21.9	121.3	56.8	57.9	98.8

KPPD 21.3 20.5 103.6 57.6 57.5 100.2

Notes A and B are given in the appendix.

Table VI

Averages of Mill Quality Data for Nov-Dec 1991
50 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	5.9	5.9	107.4	51.7	51.1	98.3	8.4	6.8	72.6
101		6.1			51.6			10.9	
102	6.9	6.6	125.6	49.8	50.6	94.7	11.0	20.2	95.0
103	3.6	4.2	65.5	53.4	55.1	101.5	6.5	7.3	56.1
104		5.7			51.4			6.7	
105		6.1			52.6			12.6	
106		6.0			52.3			13.3	
107	6.3	6.0	114.7	55.1	53.1	104.8	8.0	8.8	69.1
108		4.5			51.9			18.0	
109	4.5	4.8	81.9	52.4	53.2	99.6	7.6	8.0	65.6
110	4.8	4.7	87.4	53.0	53.5	100.8	10.1	12.7	87.2
111	6.0	5.9	109.2	54.3	54.5	103.2	21.9	22.7	189.2
112	5.9	6.0	107.4	53.2	53.3	101.2	10.1	9.3	87.2
113		5.6			52.6			6.3	
114	6.0	5.6	109.2	54.5	53.2	103.6	5.7	10.0	49.2
115	4.9	4.1	89.2	53.2	53.1	101.2	6.0	7.5	51.8
116	5.0	4.9	91.0	53.0	53.2	100.8	6.0	8.5	51.8
117	6.4	6.2	116.5	50.1	50.4	95.3	11.0	18.8	95.0

KPPD 5.5 5.5 100.4 52.8 52.6 100.4 9.4 11.6 80.8

Notes A and B are given in the appendix.

Table VI (Cont)

Averages of Mill Quality Data for Nov–Dec 1991
50 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	127.5	127.3	101.6	266.4	267.1	101.8
101		114.8			245.3	
102	118.0	116.9	94.0	249.0	245.7	95.1
103	129.7	123.4	103.3	269.2	253.1	102.8
104		136.5			290.5	
105		114.5			254.6	
106		125.6			263.6	
107	124.9	117.2	99.5	259.1	244.7	99.0
108		120.0			246.5	
109	135.9	141.6	108.3	273.3	288.3	104.4
110	129.4	134.2	103.1	266.6	277.5	101.8
111	124.9	129.8	99.5	258.0	268.4	98.6
112	125.9	131.0	100.3	257.8	271.4	98.5
113		128.5			268.0	
114	116.5	118.0	92.8	245.8	251.5	93.9
115	132.3	129.1	105.4	269.7	261.6	103.0
116	140.3	131.3	111.8	286.2	265.6	109.3
117	121.5	119.9	96.8	246.5	248.4	94.2

KPPD 127.2 125.5 101.4 262.3 261.8 100.2

Notes A and B are given in the appendix.

Table VI (Cont)

Averages of Mill Quality Data for Nov–Dec 1991
50 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	19.9	21.0	96.5	55.1	56.2	95.8
101		19.1			53.2	
102	21.9	21.1	106.2	59.9	57.2	104.2
103	20.8	20.8	100.9	58.5	56.5	101.7
104		19.9			57.4	
105		20.9			62.4	
106		20.7			58.3	
107	24.3	22.1	117.8	60.1	58.4	104.5
108		21.2			60.1	
109	20.6	21.0	99.9	55.6	55.7	96.7
110	21.7	22.3	105.2	55.9	57.3	97.2
111	19.8	19.4	96.0	58.0	57.9	100.9
112	20.1	20.0	97.5	57.3	58.3	99.7
113		20.8			57.5	
114	21.1	20.2	102.3	62.8	62.5	109.2
115	19.2	19.2	93.1	55.1	52.5	95.8
116	18.4	19.1	89.2	54.0	55.8	93.9
117	23.4	22.4	113.5	57.3	57.8	99.7

KPPD 20.9 20.6 101.5 57.5 57.5 99.9

Notes A and B are given in the appendix.

Table VII

Averages of Mill Quality Data for Jul–Aug 1991
60 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.1	5.8	108.5	60.9	61.0	96.9	7.9	8.5	73.0
101		6.4			61.7			10.0	
102	6.4	6.5	113.9	60.5	60.3	96.3	16.0	21.9	147.8
103	4.1	4.0	72.9	64.9	64.4	103.3	8.0	8.0	73.9
104	5.7	6.2	101.4	61.8	61.7	98.4	7.6	7.7	70.2
105	6.0	6.1	106.7	62.3	62.4	99.2	11.0	11.2	101.6
106	6.0	6.1	106.7	61.8	62.4	98.4	13.4	14.2	123.7
107	6.4	6.2	113.9	62.3	62.8	99.2	9.5	8.5	87.7
108		4.8			63.1			14.0	
109	5.2	4.9	92.5	61.8	64.8	98.4	8.4	8.0	77.6
111	6.0	5.9	106.7	64.5	64.1	102.7	21.2	18.2	195.8
112		6.1			63.4			8.7	
113		5.4			63.5			3.8	
115	4.2	4.3	74.7	63.2	63.9	100.6	8.0	8.9	73.9

KPPD 5.6 5.6 99.8 62.4 62.8 99.3 11.1 10.8 102.5

Notes A and B are given in the appendix.

Table VII (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
60 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	160.4	162.2	102.8	333.9	339.6	102.2
101		141.8			301.0	
102	139.0	148.5	89.1	295.0	312.9	90.3
103	148.3	148.8	95.0	303.2	310.8	92.8
104	167.4	158.7	107.3	306.4	322.7	93.8
105	153.1	147.2	98.1	330.9	329.0	101.3
106	160.5	161.1	102.8	324.5	335.8	99.3
107	142.4	138.5	91.2	303.2	294.0	92.8
108		152.6			312.5	
109	173.4	177.9	111.1	349.3	366.0	106.9
111	146.1	156.8	93.6	313.5	327.1	96.0
112		168.4			351.8	
113		162.1			347.2	
115	159.5	160.3	102.2	318.1	323.1	97.4

KPPD 155.0 156.1 99.3 317.8 326.7 97.3

Notes A and B are given in the appendix.

Table VII (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
60 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	25.0	24.2	102.8	66.4	66.3	97.1
101		23.0			63.5	
102	24.9	24.7	102.5	71.6	69.1	104.8
103	24.7	24.0	101.7	70.2	68.0	102.7
104	23.1	24.2	95.1	71.1	67.2	104.0
105	25.5	24.5	105.0	73.4	73.2	107.4
106	27.7	24.4	114.1	71.1	68.5	104.0
107	25.2	25.6	103.8	68.4	70.2	100.1
108		26.6			72.5	
109	26.7	25.1	109.9	66.7	66.7	97.6
111	22.2	22.7	91.4	71.9	68.0	105.2
112		23.2			68.6	
113		24.4			68.6	
115	23.8	23.4	98.0	67.3	66.5	98.5

KPPD 24.9 24.3 102.4 69.8 68.4 102.1

Notes A and B are given in the appendix.

Table VIII

Averages of Mill Quality Data for Sept–Oct 1991
60 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.0	5.9	107.0	61.0	60.9	97.1	8.0	8.5	74.2
101		6.4			61.6			10.1	
102	6.7	6.6	119.5	60.5	60.4	96.3	10.5	19.6	97.4
103	4.7	4.0	83.8	63.9	64.6	101.8	14.0	8.4	129.8
104	5.7	5.8	101.7	62.0	62.1	98.7	8.4	7.4	77.9
105	6.0	6.1	107.0	63.2	62.5	100.6	12.8	11.4	118.7
106	6.1	6.0	108.8	62.0	62.5	98.7	15.4	14.2	142.8
107	6.2	6.2	110.6	63.2	62.7	100.6	9.5	8.6	88.1
108		4.8			62.9			13.8	
109	4.8	4.9	85.6	61.9	64.3	98.6	7.9	8.0	73.2
111	6.1	6.0	108.8	64.8	64.2	103.2	23.2	19.1	215.1
112	6.1	6.1	108.8	62.1	63.1	98.9	8.9	9.2	82.5
113		5.4			63.5			3.8	
115		4.3			63.9			8.9	

KPPD 5.8 5.6 104.2 62.5 62.8 99.5 11.9 10.8 110.0

Notes A and B are given in the appendix.

Table VIII (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
60 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	150.8	159.9	96.6	314.0	336.0	96.2
101		141.9			300.6	
102	139.5	147.1	89.4	290.5	309.7	89.0
103	143.5	151.0	91.9	294.7	311.7	90.3
104	159.5	160.4	102.2	342.6	328.8	105.0
105	140.3	147.2	89.9	307.5	328.1	94.2
106	164.8	161.6	105.6	336.2	335.2	103.0
107	148.3	139.5	95.0	301.1	294.0	92.2
108		152.3			313.3	
109	185.4	179.6	118.8	376.9	368.5	115.5
111	154.7	156.2	99.1	324.9	326.4	99.5
112	159.5	165.8	102.2	331.3	347.3	101.5
113		162.1			347.2	
115		160.3			323.1	

KPPD 154.6 156.1 99.1 322.0 326.4 98.6

Notes A and B are given in the appendix.

Table VIII (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
60 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	26.3	24.7	108.0	70.1	66.8	102.2
101		23.0			63.5	
102	25.4	25.0	104.3	72.1	69.5	105.1
103	24.9	24.1	102.3	72.9	68.6	106.3
104	22.2	23.7	91.2	72.1	68.1	105.1
105	23.5	24.1	96.5	76.7	73.8	111.8
106	26.0	24.9	106.8	69.9	68.7	101.9
107	27.3	25.9	112.1	69.5	70.1	101.3
108		26.4			72.5	
109	26.1	25.3	107.2	66.9	66.8	97.5
111	23.1	22.8	94.9	69.4	68.2	101.2
112	23.6	23.1	96.9	68.0	68.5	99.1
113		24.4			68.6	
115		23.4			66.5	

KPPD 24.8 24.3 102.0 70.8 68.6 103.2

Notes A and B are given in the appendix.

Table IX

Averages of Mill Quality Data for Nov-Dec 1991
60 lb Flat Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	5.9	5.9	103.4	61.7	60.9	98.8	8.0	8.1	71.3
101		6.4			61.5			10.2	
102	6.8	6.6	119.1	59.2	60.2	94.8	11.0	17.8	98.1
103	4.1	4.0	71.8	63.3	64.7	101.4	6.5	7.9	58.0
104		5.8			62.1			7.4	
105		6.1			62.5			11.4	
106		6.0			62.6			14.2	
107	6.4	6.2	112.1	65.0	63.0	104.1	8.0	8.4	71.3
108		4.7			62.7			14.0	
109	4.8	4.9	84.1	62.6	63.7	100.2	6.8	7.5	60.6
111	6.0	6.0	105.1	63.8	64.1	102.2	20.9	19.9	186.4
112		6.1			63.1			9.2	
115	5.8	4.6	101.6	64.6	64.0	103.4	7.0	8.5	62.4
117	6.6	6.6	115.6	59.2	59.2	94.8	12.5	12.5	111.5

KPPD 5.8 5.7 101.6 62.4 62.5 100.0 10.1 11.2 90.0

Notes A and B are given in the appendix.

Table IX (Cont)

Averages of Mill Quality Data for Nov–Dec 1991
60 lb Flat Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	160.4	160.3	103.4	330.4	333.8	102.3
101		142.0			299.6	
102	144.0	145.4	92.8	301.0	305.8	93.2
103	159.5	153.3	102.8	339.4	318.1	105.0
104		163.6			332.5	
105		147.2			328.1	
106		163.5			338.9	
107	152.0	141.1	98.0	313.9	296.5	97.2
108		150.3			310.3	
109	178.3	182.0	114.9	362.3	372.2	112.1
111	141.7	154.2	91.3	304.0	323.1	94.1
112		165.8			347.3	
115	153.1	158.8	98.7	301.1	318.7	93.2
117	145.0	145.0	93.4	298.5	298.5	92.4

KPPD 154.3 155.2 99.4 318.8 323.1 98.7

Notes A and B are given in the appendix.

Table IX (Cont)

Averages of Mill Quality Data for Nov–Dec 1991
60 lb Flat Multiwall Grade

Code	CD Tensile			Total Tensile		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	23.3	24.9	94.9	65.0	66.6	94.6
101		22.9			63.5	
102	24.9	25.0	101.5	70.0	69.5	101.8
103	23.5	24.1	95.8	68.6	68.6	99.8
104		23.6			68.1	
105		24.1			73.8	
106		25.3			68.7	
107	29.3	26.4	119.4	73.0	70.4	106.2
108		26.3			72.5	
109	24.6	25.3	100.2	65.3	66.6	95.0
111	21.9	22.7	89.2	69.3	68.3	100.8
112		23.1			68.5	
115	24.2	23.5	98.6	70.5	67.3	102.6
117	26.4	26.4	107.6	70.0	70.0	101.8

KPPD 24.8 24.5 100.9 69.0 68.7 100.3

Notes A and B are given in the appendix.

Table X

Averages of Mill Quality Data for Jul–Aug 1991
50 lb Ext. Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	5.8	4.5	131.8	51.0	51.6	96.5	11.0	9.4	102.4
105	5.8	5.8	131.8	52.6	53.1	99.5	14.0	15.0	130.4
108		3.8			52.9			15.9	
109	3.7	3.7	84.1	52.6	55.2	99.5	9.6	8.7	89.4
118	4.1	4.2	93.2	51.1	51.4	96.7	3.0	4.7	27.9

KPPD 4.9 4.4 110.2 51.8 52.8 98.1 9.4 10.7 87.5

Notes A and B are given in the appendix.

Table X (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
50 lb Ext. Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	118.1	125.6	91.8	261.4	272.1	92.4
105	118.9	123.2	92.4	279.8	281.7	98.9
108		123.5			265.3	
109	146.7	150.1	114.0	311.5	327.5	110.1
118	115.5	121.1	89.7	254.0	268.0	89.8

KPPD 124.8 128.7 97.0 276.7 282.9 97.8

Notes A and B are given in the appendix.

Table X (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
50 lb Ext. Multiwall Grade

Code	MD Stretch Percent			CD Stretch Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.9	9.4	95.6	6.1	10.3	93.0
105	6.3	6.3	87.3	5.1	5.0	77.7
108		7.0			7.0	
109	6.3	5.6	87.3	4.9	5.2	74.7
118	8.2	7.8	113.6	5.2	5.3	79.3

KPPD 6.9 7.2 95.9 5.3 6.6 81.2

Notes A and B are given in the appendix.

Table X (Cont)

Averages of Mill Quality Data for Jul–Aug 1991
50 lb Ext. Multiwall Grade

Code	CD TEA Percent			Total TEA Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	9.7	8.7	123.7	23.3	20.3	112.2
105	7.2	7.4	91.8	20.7	21.5	99.7
108		9.8			23.9	
109	7.7	6.7	98.2	18.5	18.1	89.1
118	6.6	6.6	84.2	20.6	20.0	99.2

KPPD 7.8 7.8 99.5 20.8 20.8 100.1

Notes A and B are given in the appendix.

Table XI

Averages of Mill Quality Data for Sept–Oct 1991
50 lb Ext. Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	5.8	5.0	130.0	53.0	51.3	100.8	21.9	10.0	199.1
105	3.7	5.8	83.0	52.7	53.3	100.3	7.0	14.4	63.6
108		3.6			52.6			17.2	
109		3.7			54.5			9.1	
118	4.1	4.2	91.9	51.1	51.1	97.2	3.0	4.3	27.3

KPPD	4.5	4.5	101.6	52.3	52.6	99.4	10.6	11.0	96.7
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Notes A and B are given in the appendix.

Table XI (Cont)

Averages of Mill Quality Data for Sept-Oct 1991
50 lb Ext. Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	118.9	122.6	93.7	259.2	267.8	92.9
105	153.1	120.7	120.6	323.5	279.4	115.9
108		124.7			265.3	
109		147.7			320.0	
118	118.5	119.1	93.3	251.0	262.9	89.9

KPPD 130.2 127.0 102.5 277.9 279.1 99.6

Notes A and B are given in the appendix.

Table XI (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
50 lb Ext. Multiwall Grade

Code	MD Stretch			CD Stretch		
	Percent			Percent		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100	6.0	8.4	85.2	4.2	9.1	66.2
105	6.3	6.3	89.5	5.2	5.0	82.0
108		7.0			7.0	
109		5.6			5.2	
118	7.8	7.9	110.8	5.8	5.4	91.5

KPPD	6.7	7.0	95.2	5.1	6.3	79.9
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Notes A and B are given in the appendix.

Table XI (Cont)

Averages of Mill Quality Data for Sept–Oct 1991
50 lb Ext. Multiwall Grade

Code	CD TEA Percent			Total TEA Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	6.5	8.3	82.7	19.5	20.1	94.8
105	8.3	7.6	105.6	19.3	21.0	93.9
108		10.0			23.6	
109		6.8			18.0	
118	6.6	6.6	84.0	20.3	20.1	98.7

KPPD 7.1 7.9 90.8 19.7 20.6 95.8

Notes A and B are given in the appendix.

Table XII

Averages of Mill Quality Data for Nov-Dec 1991
50 lb Ext. Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		5.4			51.9			14.4	
105		5.1			53.2			12.0	
108		3.5			52.4			18.8	
109	3.4	3.7	77.6	53.6	54.9	101.7	9.8	9.2	84.0
118	4.0	4.2	91.3	51.1	51.0	97.0	3.0	3.9	25.7

KPPD 3.7 4.4 84.5 52.4 52.7 99.4 6.4 11.7 54.9

Notes A and B are given in the appendix.

Table XII (Cont)

Averages of Mill Quality Data for Nov-Dec 1991
50 lb Ext. Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		122.7			268.5	
105		131.8			294.0	
108		121.5			258.5	
109	143.4	151.1	110.9	300.5	324.8	106.8
118	130.5	119.6	100.9	275.0	260.6	97.8

KPPD 137.0 129.3 105.9 287.8 281.3 102.3

Notes A and B are given in the appendix.

Table XII (Cont)

Averages of Mill Quality Data for Nov–Dec 1991
50 lb Ext. Multiwall Grade

Code	MD Stretch			CD Stretch		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100		6.6			9.1	
105		6.3			5.0	
108		7.1			7.0	
109	6.0	5.4	90.1	4.8	5.2	75.9
118	8.1	7.9	121.6	5.1	5.3	80.7

KPPD 7.1 6.7 105.9 5.0 6.3 78.3

Notes A and B are given in the appendix.

Table XII (Cont)

Averages of Mill Quality Data for Nov-Dec 1991
50 lb Ext. Multiwall Grade

Code	CD TEA Percent			Total TEA Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		8.5			21.5	
105		7.5			20.6	
108		10.2			23.8	
109	7.7	6.9	97.0	18.2	17.9	87.6
118	6.4	6.6	80.6	20.0	20.1	96.2

KPPD 7.1 7.9 88.8 19.1 20.8 91.9

Notes A and B are given in the appendix.

Table XIII

Averages of Mill Quality Data for JUL—AUG 1991
60 lb Ext. Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	5.4	4.7	118.9	61.2	61.9	97.5	12.1	14.9	110.8
105	5.7	6.0	125.6	63.1	62.7	100.6	13.6	13.5	124.5
108		4.0			63.1			13.4	
109	4.0	3.9	88.1	63.2	64.9	100.7	9.6	8.2	87.9
118	4.2	4.1	92.5	60.4	61.1	96.3	3.0	4.6	27.5

KPPD 4.8 4.5 106.3 62.0 62.7 98.8 9.6 10.9 87.7

Notes A and B are given in the appendix.

Table XIII (Cont)

Averages of Mill Quality Data for JUL—AUG 1991
60 lb Ext. Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	141.5	154.6	87.8	342.3	347.4	95.5
105	139.1	154.4	86.3	202.1	354.9	56.4
108		149.9			327.6	
109	178.6	201.9	110.8	385.5	433.0	107.5
118	140.0	144.8	86.9	321.0	329.5	89.5

KPPD 149.8 161.1 93.0 312.7 358.5 87.2

Notes A and B are given in the appendix.

Table XIII (Cont)

Averages of Mill Quality Data for JUL—AUG 1991
60 lb Ext. Multiwall Grade

Code	MD Stretch Percent			CD Stretch Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	7.9	7.1	115.8	5.8	5.4	107.8
105	6.7	6.5	98.2	5.2	5.0	96.7
108		7.0			6.1	
109	6.6	5.6	96.8	4.3	5.2	79.9
118	8.1	7.9	118.8	5.0	5.2	92.9

KPPD 7.3 6.8 107.4 5.1 5.4 94.3

Notes A and B are given in the appendix.

Table XIII (Cont)

Averages of Mill Quality Data for JUL–AUG 1991
60 lb Ext. Multiwall Grade

Code	CD TEA Percent			Total TEA Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100	10.4	9.7	119.3	26.6	31.1	104.5
105	8.2	8.5	94.0	26.0	24.6	102.1
108		10.0			26.2	
109	7.8	7.7	89.4	21.6	21.2	84.8
118	7.2	7.7	82.6	22.3	24.2	87.6

KPPD 8.4 8.7 96.3 24.1 25.5 94.8

Notes A and B are given in the appendix.

Table XIV

Averages of Mill Quality Data for SEPT-OCT 1991
60 lb Ext. Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		4.9			61.9			15.3	
105	5.9	5.9	129.4	62.0	62.7	99.1	22.6	15.2	197.6
108		3.9			63.0			14.2	
109	4.0	3.9	87.7	62.7	64.4	100.2	8.2	8.3	71.7
118	4.2	4.2	92.1	60.6	60.8	96.9	3.0	4.2	26.2

KPPD 4.7 4.6 103.1 61.8 62.6 98.7 11.3 11.4 98.5

Notes A and B are given in the appendix.

Table XIV (Cont)

Averages of Mill Quality Data for SEPT-OCT 1991
60 lb Ext. Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		154.4			344.1	
105	154.0	151.5	97.4	337.5	321.1	97.7
108		148.5			324.5	
109	192.0	193.5	121.4	388.6	412.5	112.5
118	145.0	142.6	91.7	331.5	325.4	95.9

KPPD 163.7 158.1 103.5 352.5 345.5 102.0

Notes A and B are given in the appendix.

Table XIV (Cont)

Averages of Mill Quality Data for SEPT-OCT 1991
60 lb Ext. Multiwall Grade

Code	MD Stretch Percent			CD Stretch Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		7.3			5.4	
105	6.3	6.5	91.0	5.1	5.0	94.4
108		7.1			6.1	
109	6.7	5.7	96.8	5.0	5.2	92.6
118	7.9	8.0	114.2	5.8	5.3	107.4

KPPD	7.0	6.9	100.7	5.3	5.4	98.1
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Notes A and B are given in the appendix.

Table XIV (Cont)

Averages of Mill Quality Data for SEPT–OCT 1991
60 lb Ext. Multiwall Grade

Code	CD TEA Percent			Total TEA Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		10.0			32.6	
105	8.5	8.4	97.0	24.4	29.1	91.2
108		9.9			26.3	
109	9.3	7.8	106.2	23.1	21.5	86.4
118	8.0	7.7	91.3	22.9	24.2	85.6

KPPD	8.6	8.8	98.2	23.5	26.7	87.8
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Notes A and B are given in the appendix.

Table XV

Averages of Mill Quality Data for NOV-DEC 1991
60 lb Ext. Multiwall Grade

Code	Moisture Content Percent			Adj. Basis Wt. *A lb/3000 sq.ft.			Gurley Porosity s/100 cc		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		5.0			61.8			12.7	
105		5.9			62.6			15.2	
108		3.7			62.8			15.8	
109	3.9	3.9	85.9	63.2	64.2	101.3	9.7	8.6	86.6
118	4.2	4.2	92.5	60.4	60.6	96.8	3.0	3.7	26.8

KPPD 4.1 4.5 89.2 61.8 62.4 99.0 6.4 11.2 56.7

Notes A and B are given in the appendix.

Table XV (Cont)

Averages of Mill Quality Data for NOV-DEC 1991
60 lb Ext. Multiwall Grade

Code	MD Tear g/sheet			Total Tear g/sheet		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		158.0			249.3	
105		151.5			321.1	
108		147.0			317.0	
109	179.2	194.3	112.8	375.2	413.6	115.3
118	148.0	143.6	93.2	318.5	325.5	97.9

KPPD 163.6 158.9 103.0 346.9 325.3 106.6

Notes A and B are given in the appendix.

Table XV (Cont)

Averages of Mill Quality Data for NOV-DEC 1991
60 lb Ext. Multiwall Grade

Code	MD Stretch			CD Stretch		
	Cur.	Cum	Ind.	Cur.	Cum	Ind.
	Av.	Av.	*B	Av.	Av.	*B
100		7.2			5.4	
105		6.5			5.0	
108		7.2			6.1	
109	6.4	5.7	92.2	4.5	5.1	84.0
118	8.3	8.1	119.6	5.1	5.2	95.1

KPPD 7.4 6.9 105.9 4.8 5.4 89.6

Notes A and B are given in the appendix.

Table XV (Cont)

Averages of Mill Quality Data for NOV-DEC 1991
60 lb Ext. Multiwall Grade

Code	CD TEA Percent			Total TEA Percent		
	Cur. Av.	Cum Av.	Ind. *B	Cur. Av.	Cum Av.	Ind. *B
100		10.2			26.1	
105		8.2			24.8	
108		10.0			25.7	
109	8.4	7.8	95.5	21.1	21.5	86.2
118	8.1	7.8	92.0	24.0	24.3	98.0

KPPD 8.3 8.8 93.8 22.6 24.5 92.1

Notes A and B are given in the appendix.

TABLE XVI
Data on Conditioning and Testing Environments
JUL-AUG, SEPT-OCT, NOV-DEC 1991

Mill	Conditioning, Before Testing			
<u>Code</u>	<u>Preconditioning</u>	<u>Temp, °C</u>	<u>RH, %</u>	<u>Time, min</u>
100	NO	22.8	50	24 HRS
101	NO	22.8	50	0
102	NO	22.8	50	10
103	NO	22.8	50	15
104	NO	21.1	50	20
105	NO	21.1	50	20
106	NO	21.1	50	20
107	YES	22.8	50	10
108	NO	22.2	50	30
109	NO	22.8	50	20
110	NO	22.8	50	20
111	NO	22.8	50	5
112	NO	22.8	50	5
113	NO	22.8	50	5
114	NO	22.8	50	5
115	NO	22.8	50	15
116	NO	22.8	50	15
117	NO	22.8	50	10
118	NO	22.8	50	10

TABLE XVII
Tear and Tensile Testing Variables
JUL-AUG, SEPT-OCT, NOV-DEC 1991

Mill	Tear Tester Tensile Method				Tensile Test Variables		
<u>Code</u>	<u>Old</u>	<u>New</u>	<u>T404</u>	<u>T494</u>	<u>Length, in</u>	<u>Width, in</u>	<u>Speed, in/min</u>
100		x		x	6	1	1
101		x		x	7.1	1	0.43
102	x			x	7.1	1	1
103		x		x	7	1	4
104		x		x	5	1	5
105		x		x	5	1	5
106		x		x	5	1	5
107	x			x	7.1	1	2
108	x			x	4.8	1	2
109		x		x	7.1	1	2
110		x		x	7.1	1	2
111		x		x	6	1	50 mm
112		x		x	6	1	50 mm
113		x		x	6	1	50 mm
114		x		x	6	1	6
115		x		x	8	1	2
116		x		x	8	1	2
117	x			x	7.1	1	1
118	x			x	4.8	1	1

APPENDIX

NOTES A AND B USED IN TABULATIONS OF MILL DATA

Note A, used in the tables of mill data, defines the procedure for calculating adjusted basis weight. The adjusted basis weight is that corresponding to a moisture content of 7.25%, calculated as follows:

$$ABW = RBW [(100 - RMC) / (100 - 7.25)]$$

where: ABW = adjusted basis weight, RBW = reported basis weight, and RMC = reported moisture content.

Note B, used in the tables of mill data, defines the procedures for calculating either machine index or K.P.P.D. index. These indexes are the ratio of either the machine or KPPD current average to the KPPD cumulative average, calculated as follows:

$$MI = 100 (CMA/CUM KPPDA)$$

$$KPPDI = 100 (CKPPDA/CUM KPPDA)$$

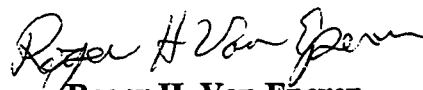
where: MI = Machine Index, KPPDI = KPPD index,

CMA = current machine average for a specific physical property of a specific multiwall bag paper grade obtained during the current month on a specific machine,

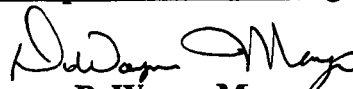
CKPPDA = current average of all machine averages for a specific physical property of a specific multiwall bag paper grade obtained during the current month,

and: CUM KPPDA = the average CKPPDA for the previous twelve months, including the current month.

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