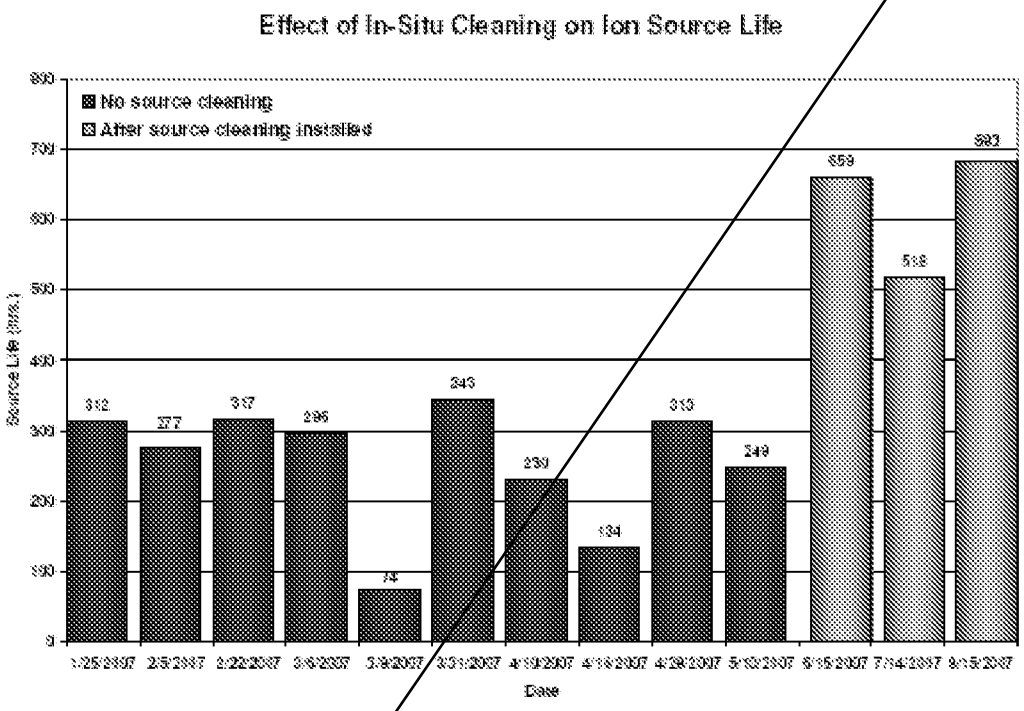

Effect of In-Situ Cleaning on Ion Source Life
No source cleaning
After source cleaning installed
Source Life (Hrs.)
Date
312
277
317
296
74
343
230
134
313
249
659
518
683

FIG. 1

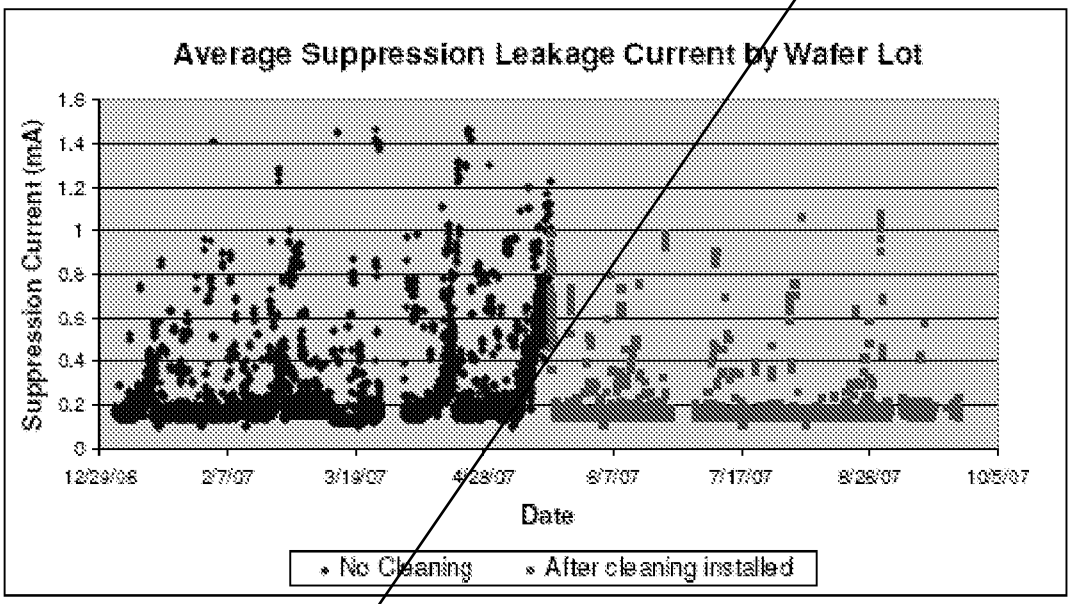

Average Suppression Leakage Current by Wafer Lot
Suppression Current (mA)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
12/29/06
2/7/07
3/19/07
4/28/07
6/7/07
7/17/07
8/26/07
10/5/07
Date
No Cleaning
After cleaning installed

FIG. 2

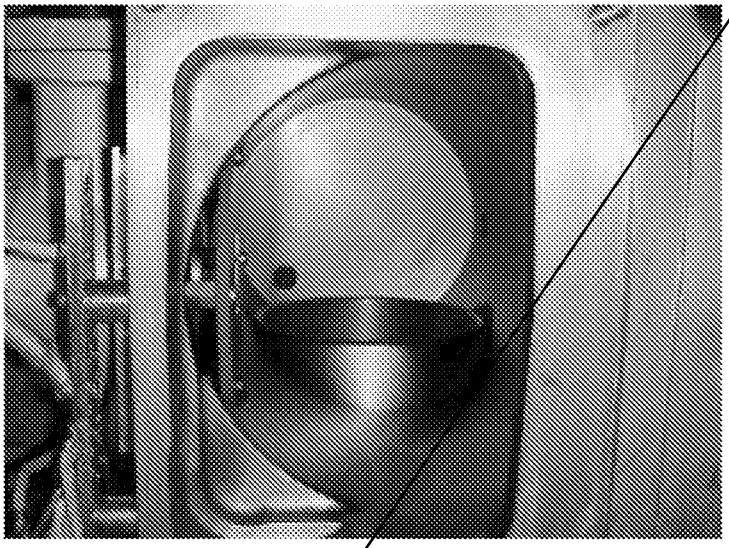


FIG. 3A

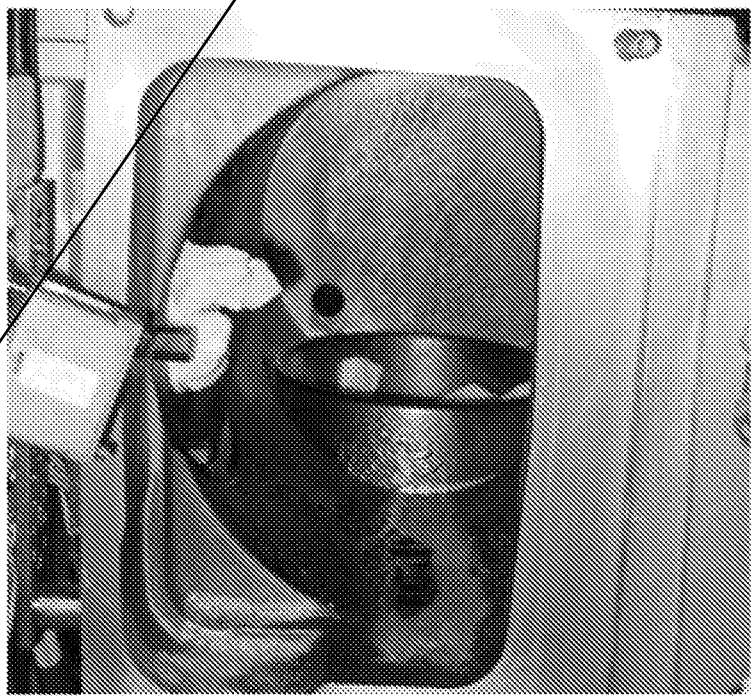


FIG. 3B

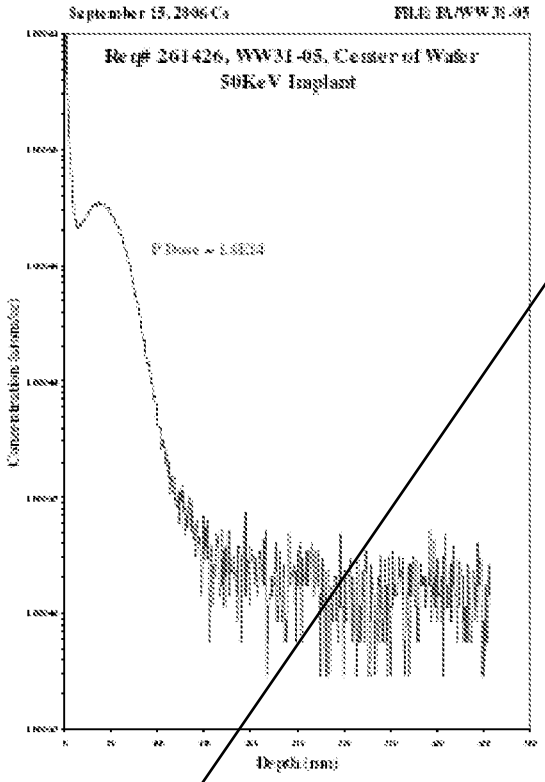

Req# 261426, WW31-05, Center of Wafer
50KeV Implant

FIG. 4A

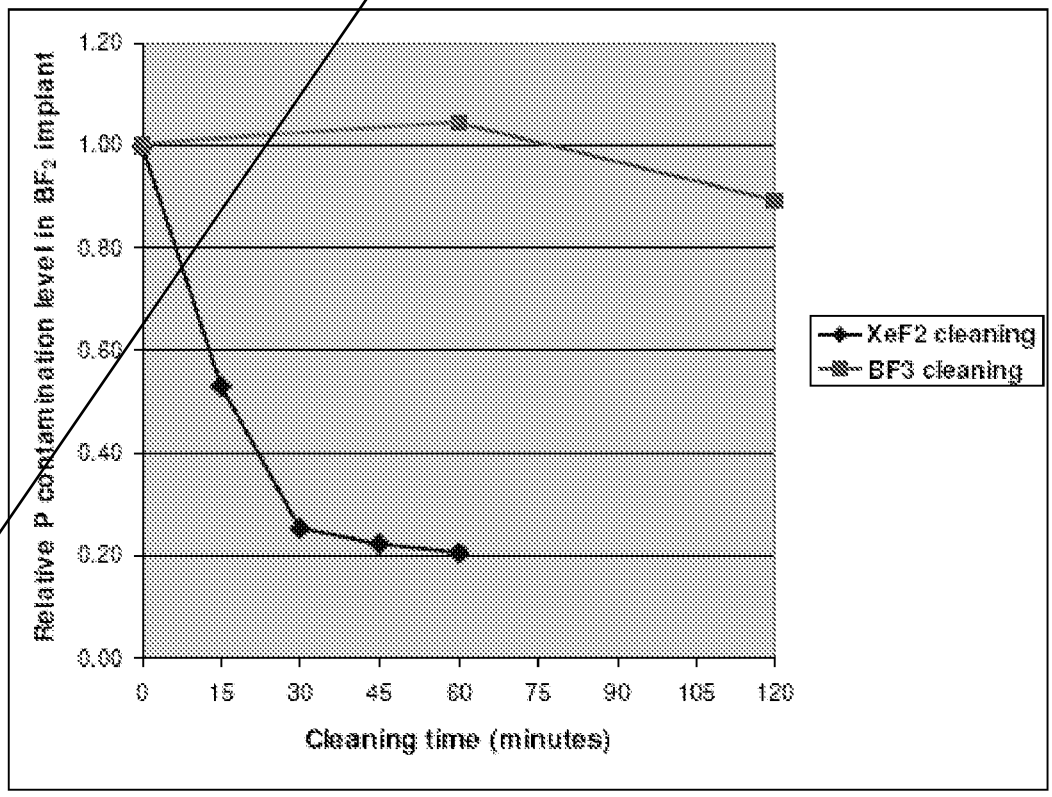

Relative P contamination level in BF2 implant
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0
15
30
45
60
75
90
105
120
Cleaning time (minutes)
XeF2 cleaning
BF3 cleaning

FIG. 4B

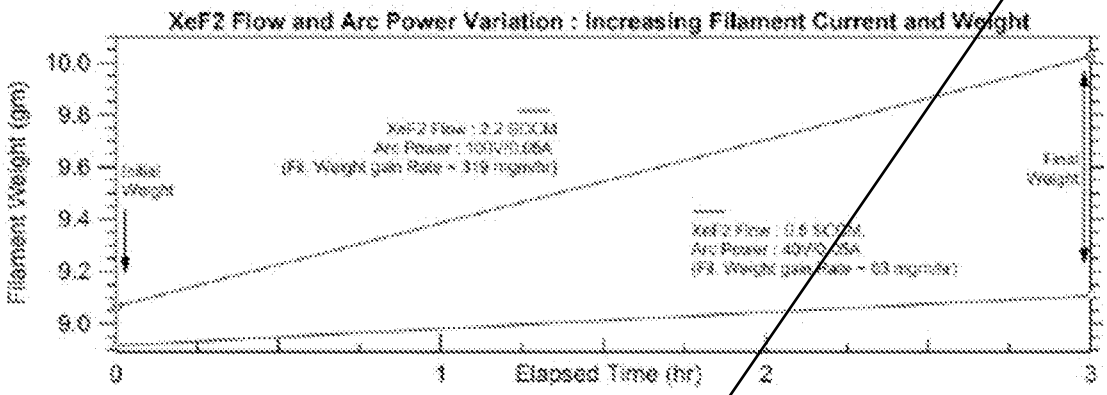

XeF2 Flow and Arc Power Variation : Increasing Filament Current and Weight
Filament Weight (gm)
10.0
9.8
9.6
9.4
9.2
9.0
0
1
2
3
Elapsed Time (hr)

FIG. 5A

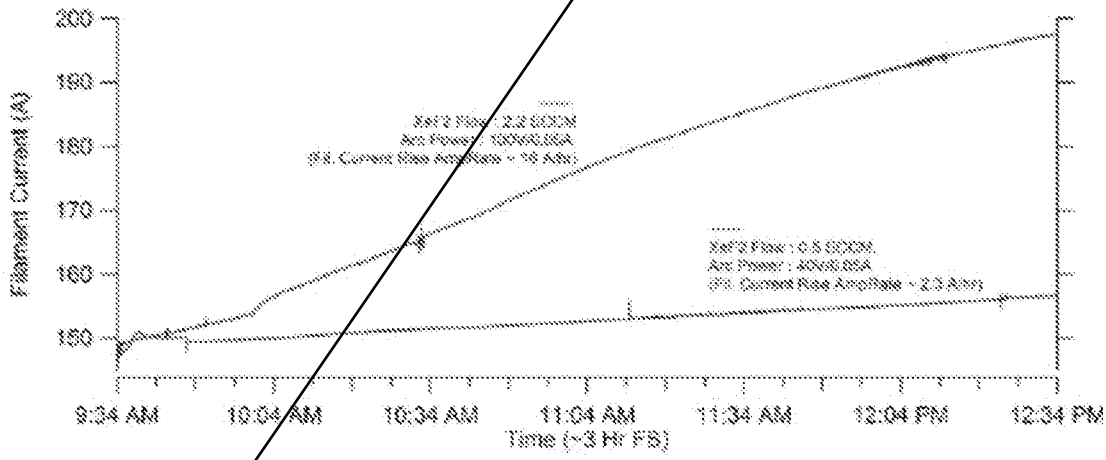

Filament Current (A)
200
190
180
170
160
150
9:34 AM
10:04 AM
10:34 AM
11:04 AM
11:34 AM
12:04 PM
12:34 PM
Time (~3 Hr FS)

FIG. 5B

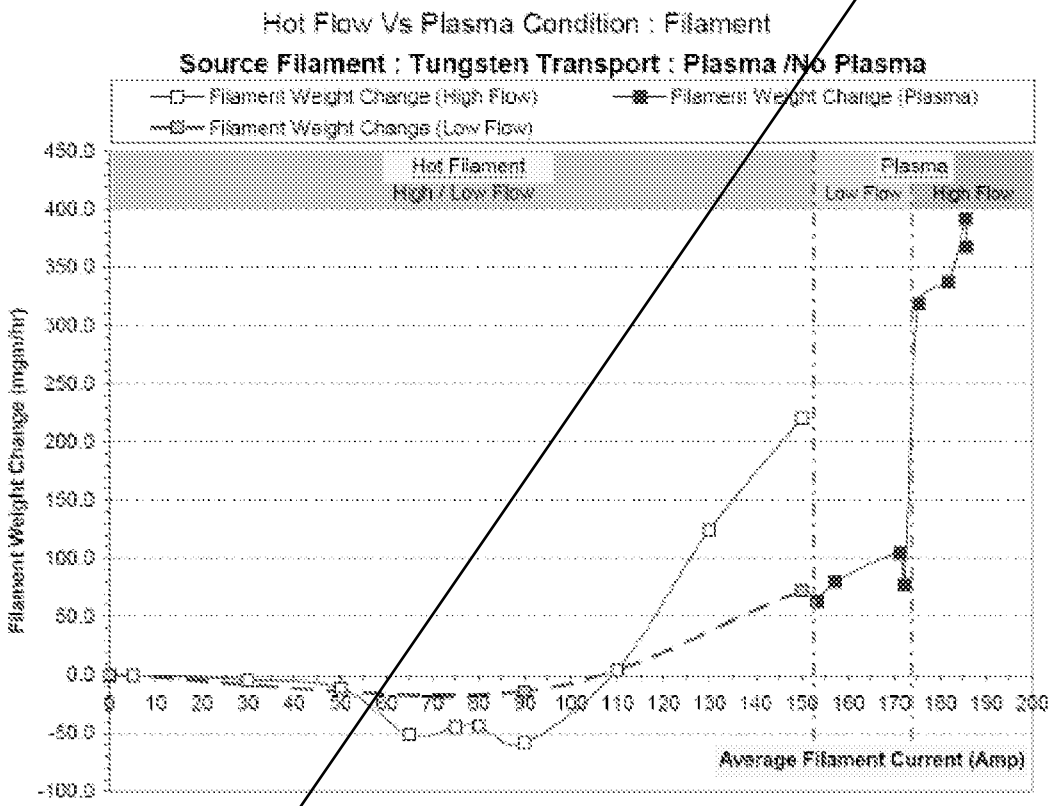
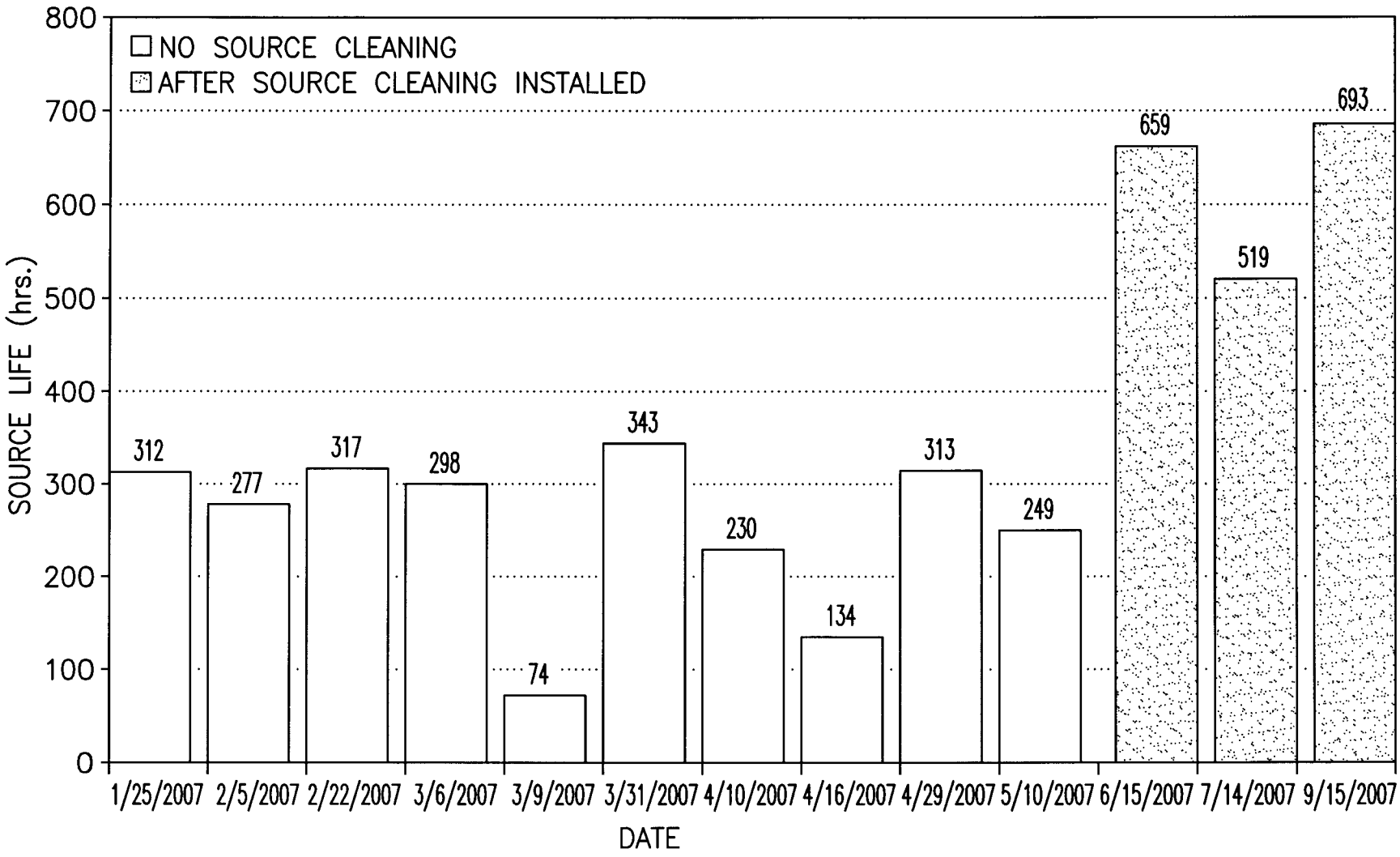
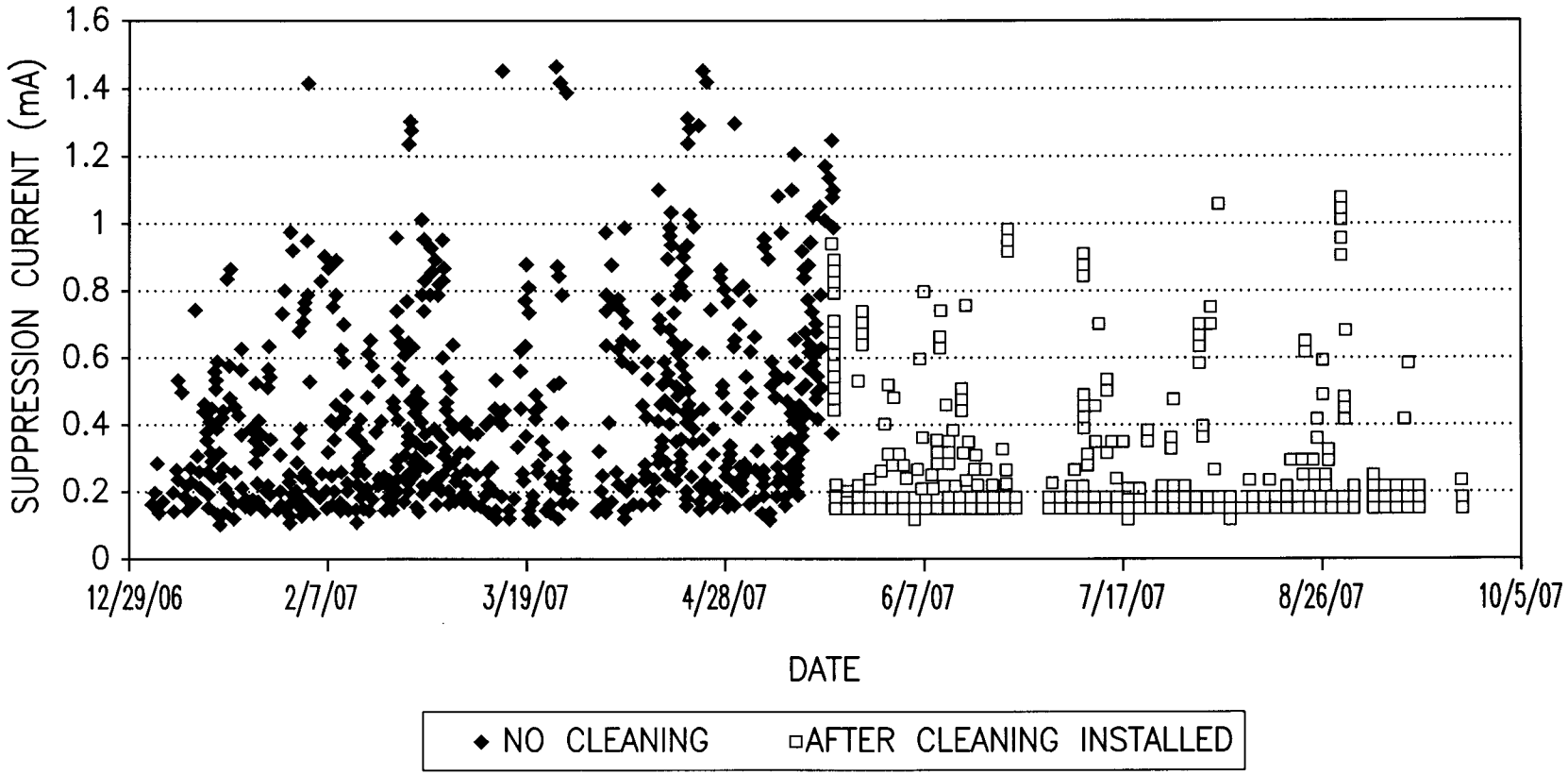

Hot Flow Vs Plasma Condition : Filament
Source Filament : Tungsten Transport : Plasma /NO Plasma
Filament Weight Change (High Flow)
Filament Weight Change (Plasma)
Filament Weight Change (Low Flow)
Hot Filament
High / Low Flow
Plasma
Low Flow
High Flow
Filament Weight Change (mgm/hr)
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
-50.0
-100.0
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
Average Filament Current (Amp)

FIG. 6



EFFECT OF In-Situ CLEANING ON ION SOURCE LIFE

FIG. 1



AVERAGE SUPPRESSION LEAKAGE CURRENT BY WAFER LOT

FIG.2



FIG.3A



FIG.3B

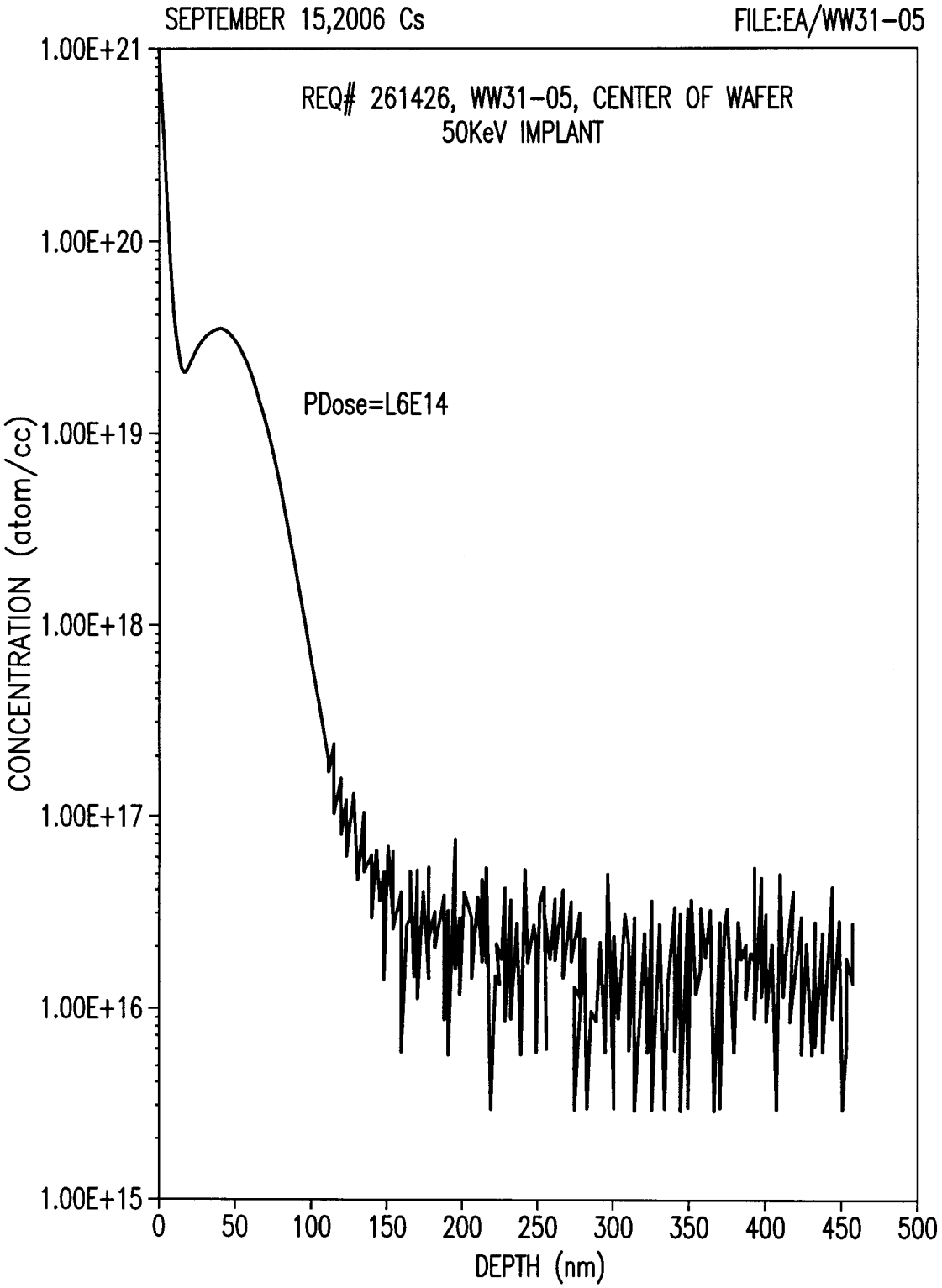

SEPTEMBER 15,2006 Cs
FILE:EA/WW31-05
REQ# 261426, WW31-05, CENTER OF WAFER
50KeV IMPLANT
PDose=L6E14
CONCENTRATION (atom/cc)
1.00E+21
1.00E+20
1.00E+19
1.00E+18
1.00E+17
1.00E+16
1.00E+15
0
50
100
150
200
250
300
350
400
450
500
DEPTH (nm)

FIG.4A

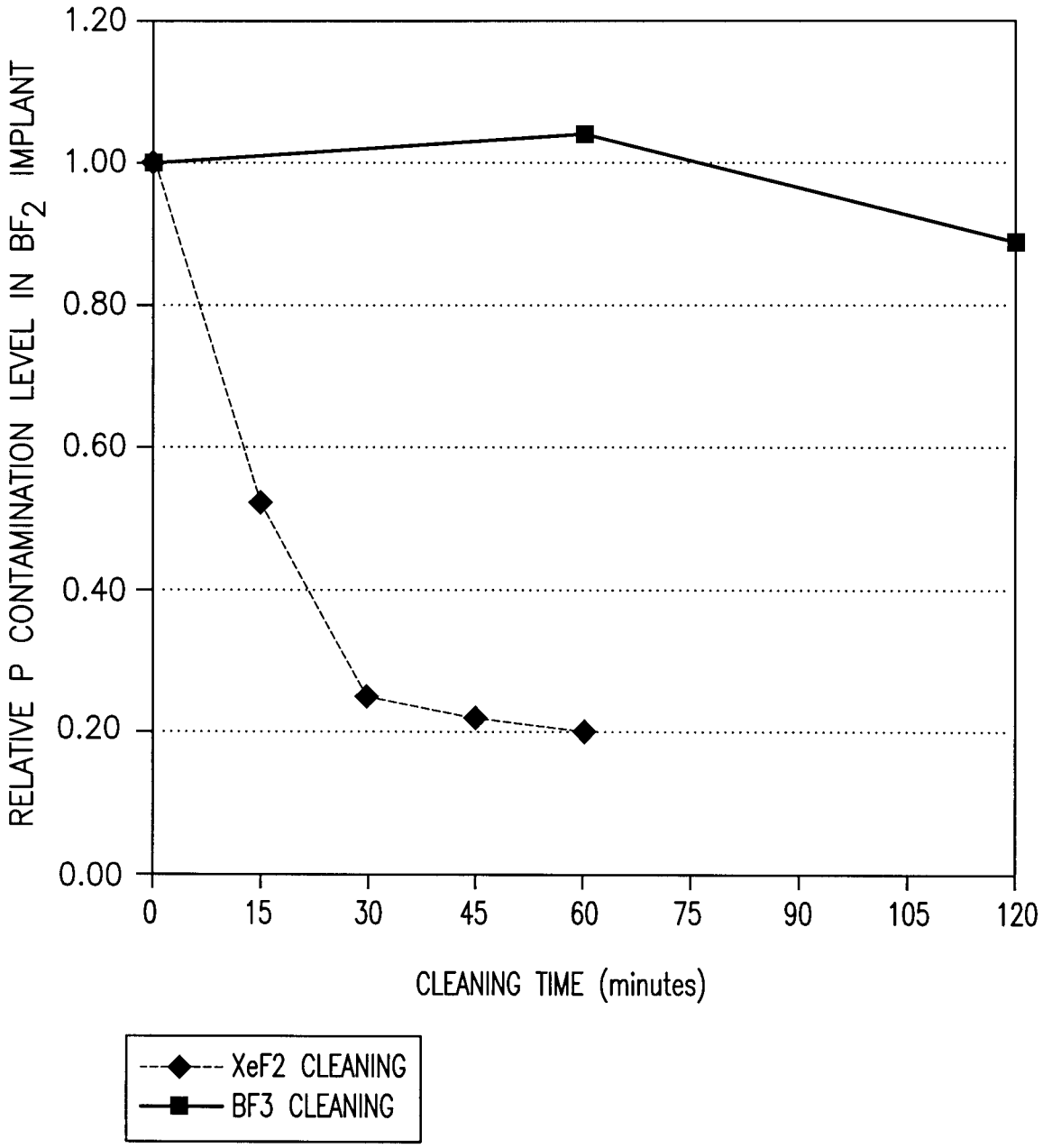

1.20
1.00
0.80
0.60
0.40
0.20
0.00
RELATIVE P CONTAMINATION LEVEL IN BF_2 IMPLANT
0
15
30
45
60
75
90
105
120
CLEANING TIME (minutes)
XeF2 CLEANING
BF3 CLEANING

FIG.4B

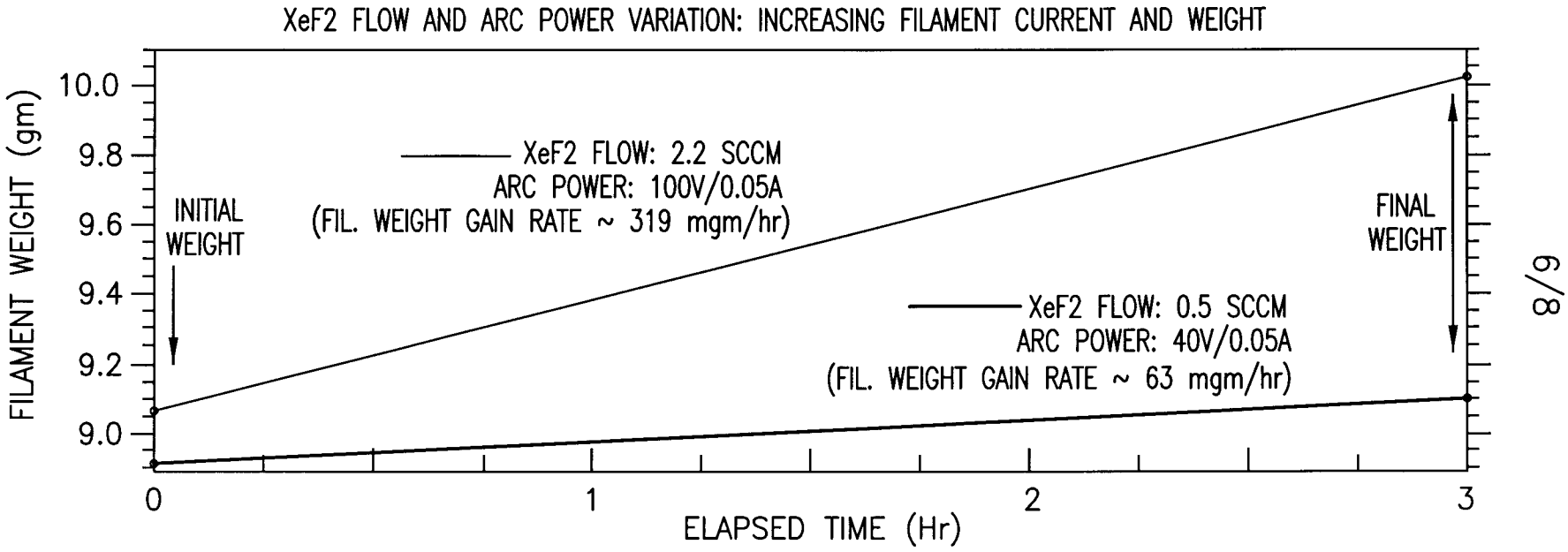

XeF2 FLOW AND ARC POWER VARIATION: INCREASING FILAMENT CURRENT AND WEIGHT
FILAMENT WEIGHT (gm)
10.0
9.8
9.6
9.4
9.2
9.0
INITIAL WEIGHT
XeF2 FLOW: 2.2 SCCM
ARC POWER: 100V/0.05A
(FIL. WEIGHT GAIN RATE ~ 319 mgm/hr)
FINAL WEIGHT
XeF2 FLOW: 0.5 SCCM
ARC POWER: 40V/0.05A
(FIL. WEIGHT GAIN RATE ~ 63 mgm/hr)
0
1
2
3
ELAPSED TIME (Hr)

FIG.5A

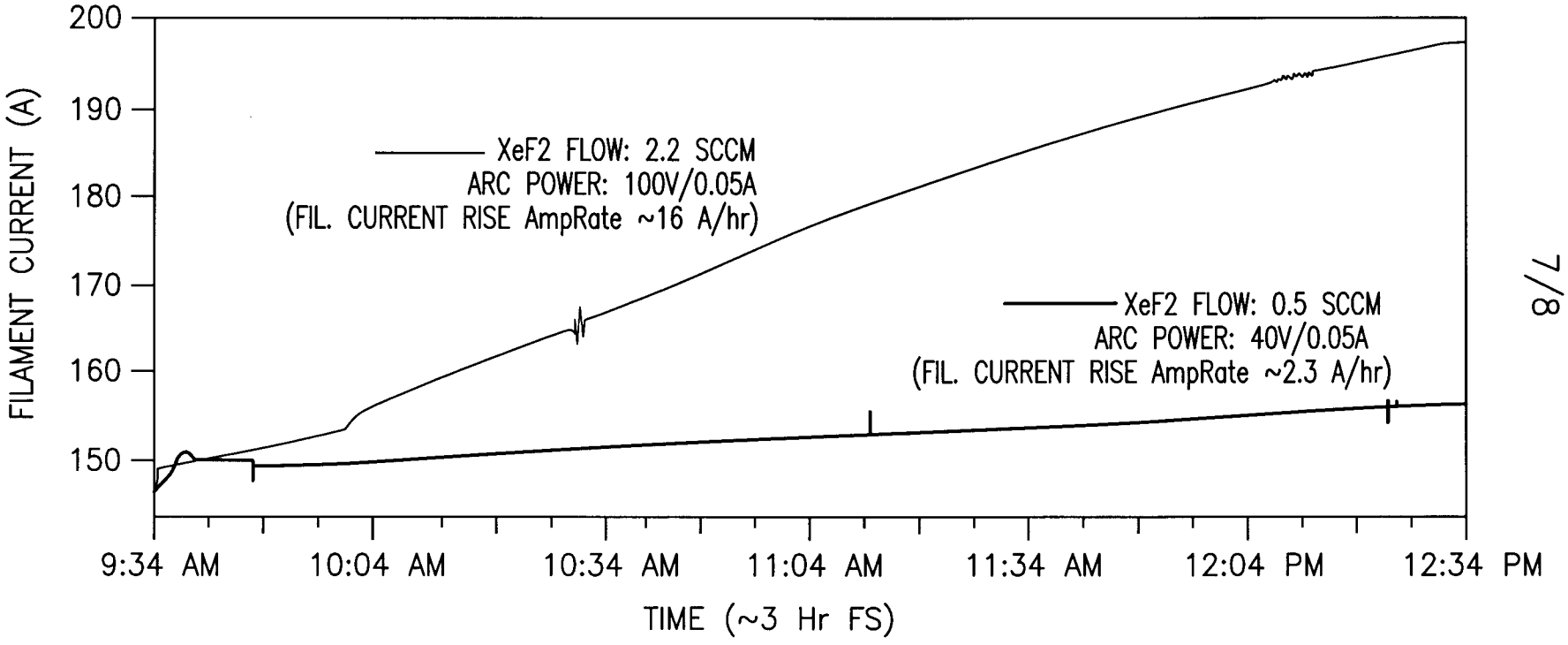
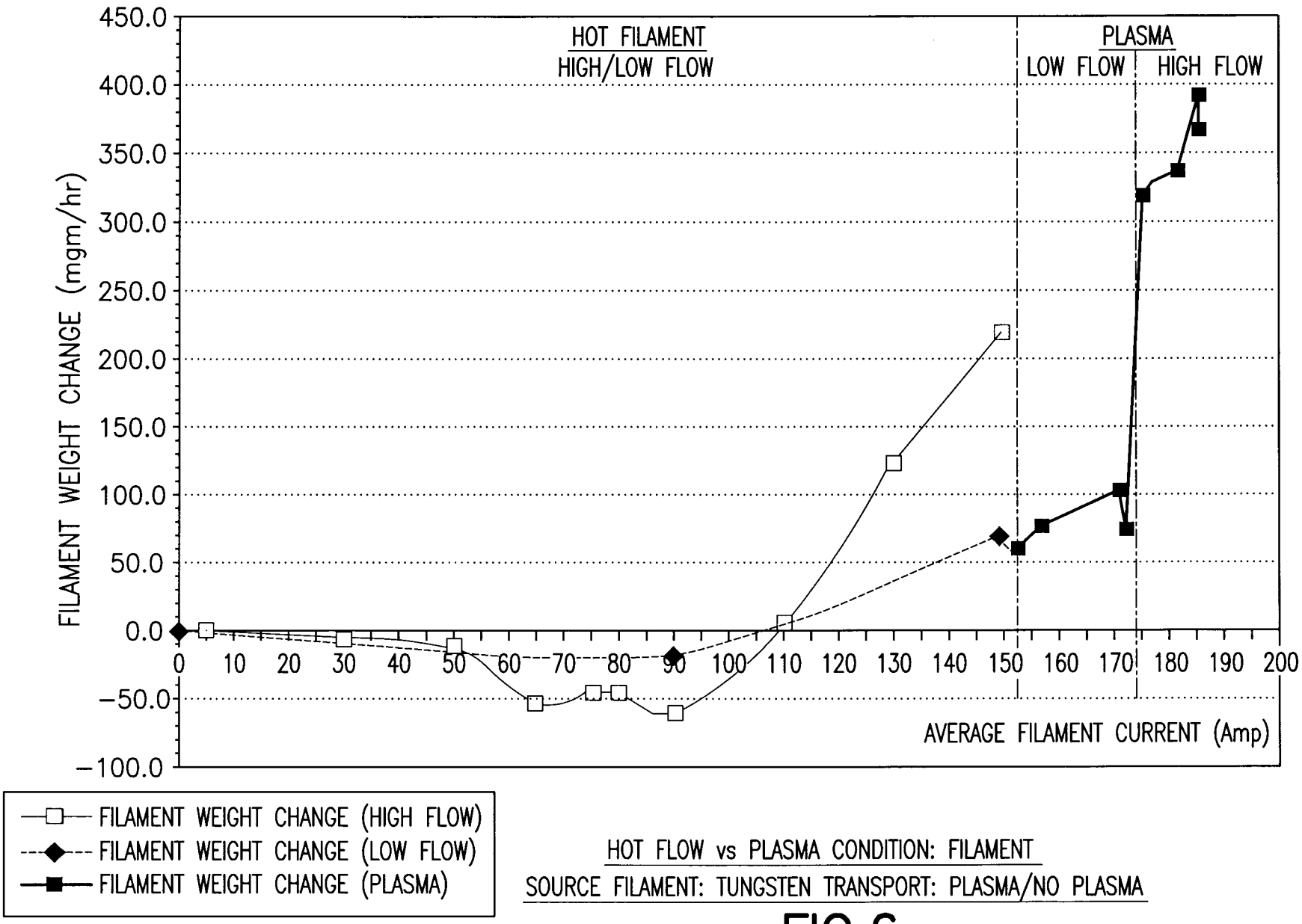

200
190
180
170
160
150
FILAMENT CURRENT (A)
XeF2 FLOW: 2.2 SCCM
ARC POWER: 100V/0.05A
(FIL. CURRENT RISE AmpRate ~16 A/hr)
XeF2 FLOW: 0.5 SCCM
ARC POWER: 40V/0.05A
(FIL. CURRENT RISE AmpRate ~2.3 A/hr)
9:34 AM
10:04 AM
10:34 AM
11:04 AM
11:34 AM
12:04 PM
12:34 PM
TIME (~3 Hr FS)

FIG.5B



HOT FLOW vs PLASMA CONDITION: FILAMENT
SOURCE FILAMENT: TUNGSTEN TRANSPORT: PLASMA/NO PLASMA

FIG.6