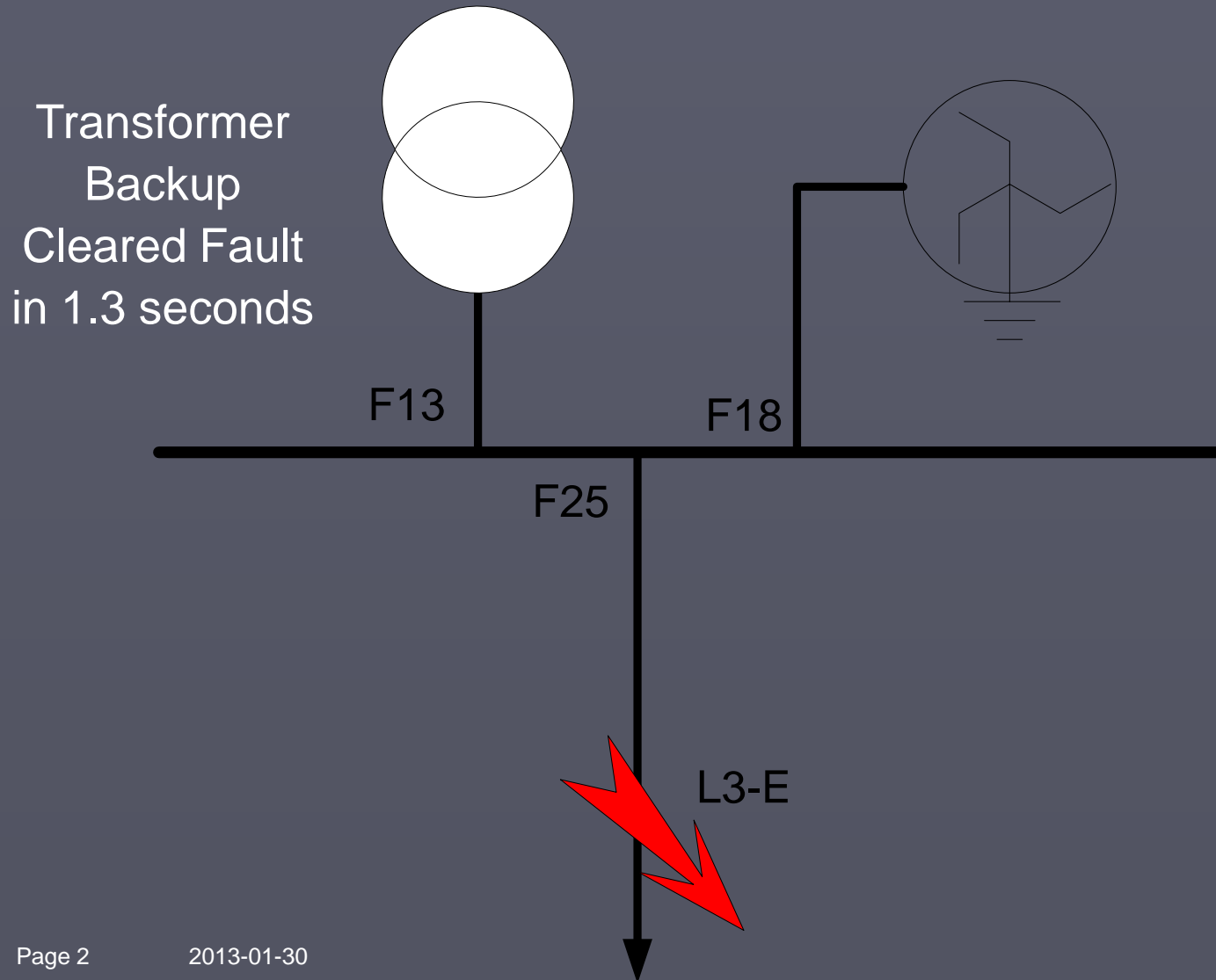




Tripping for Forces of Nature... Earth, Wind, and Slow Motor Starts

Roy Moxley

Distribution Cable Protection Failed to Trip

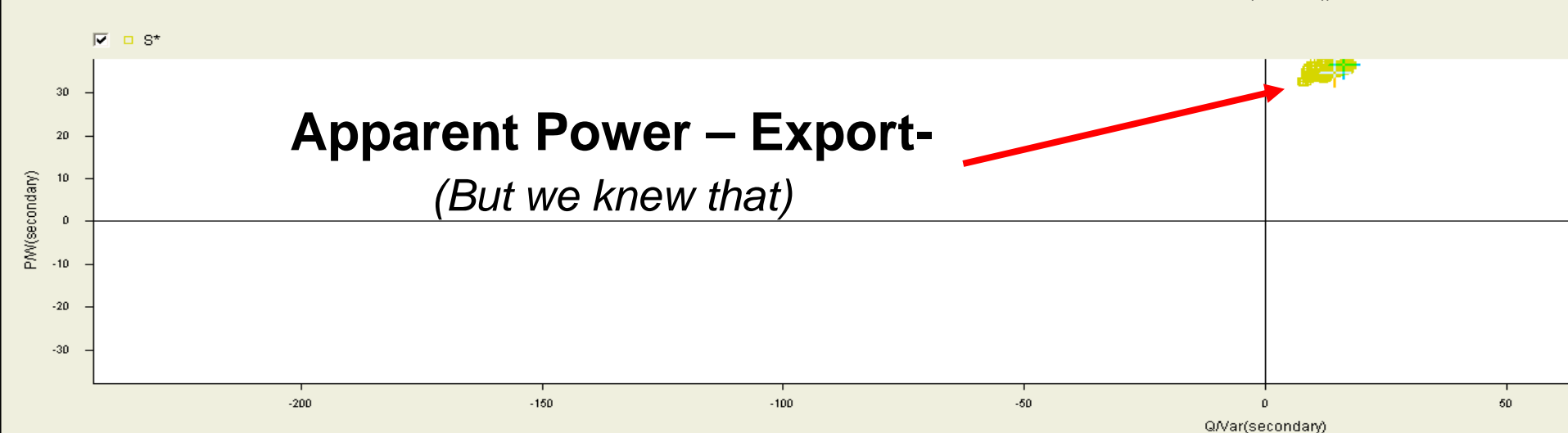
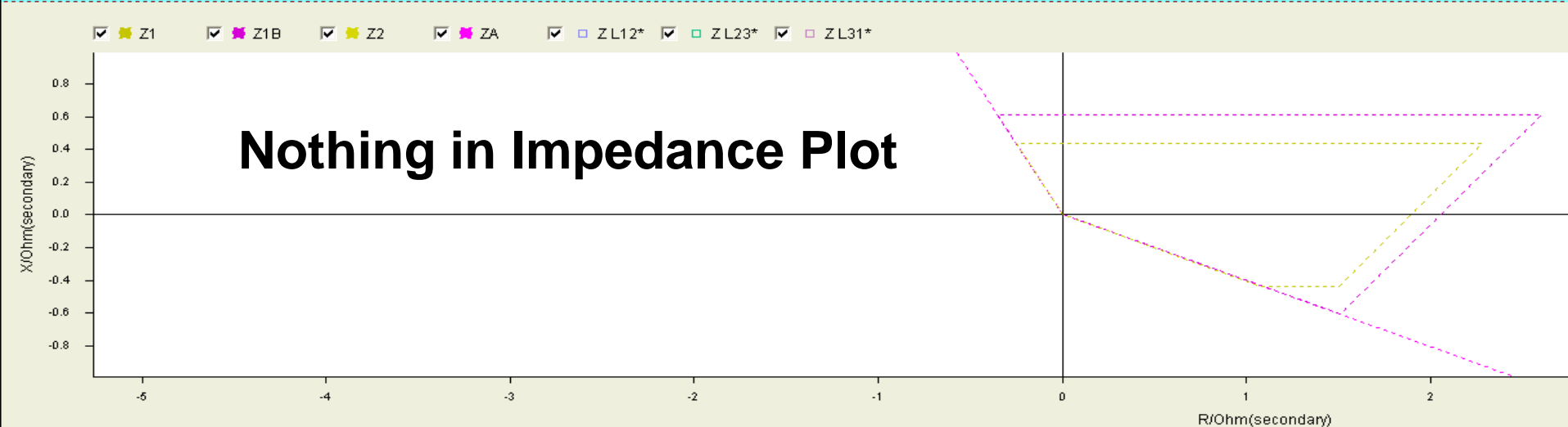
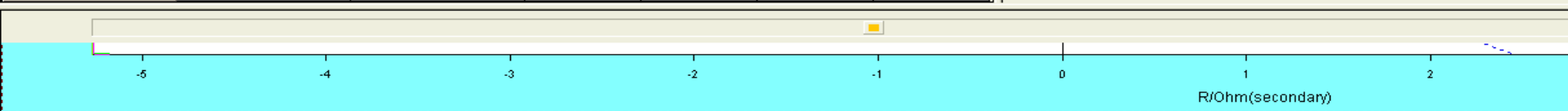




**Accurate Fault
Location is
Useful**

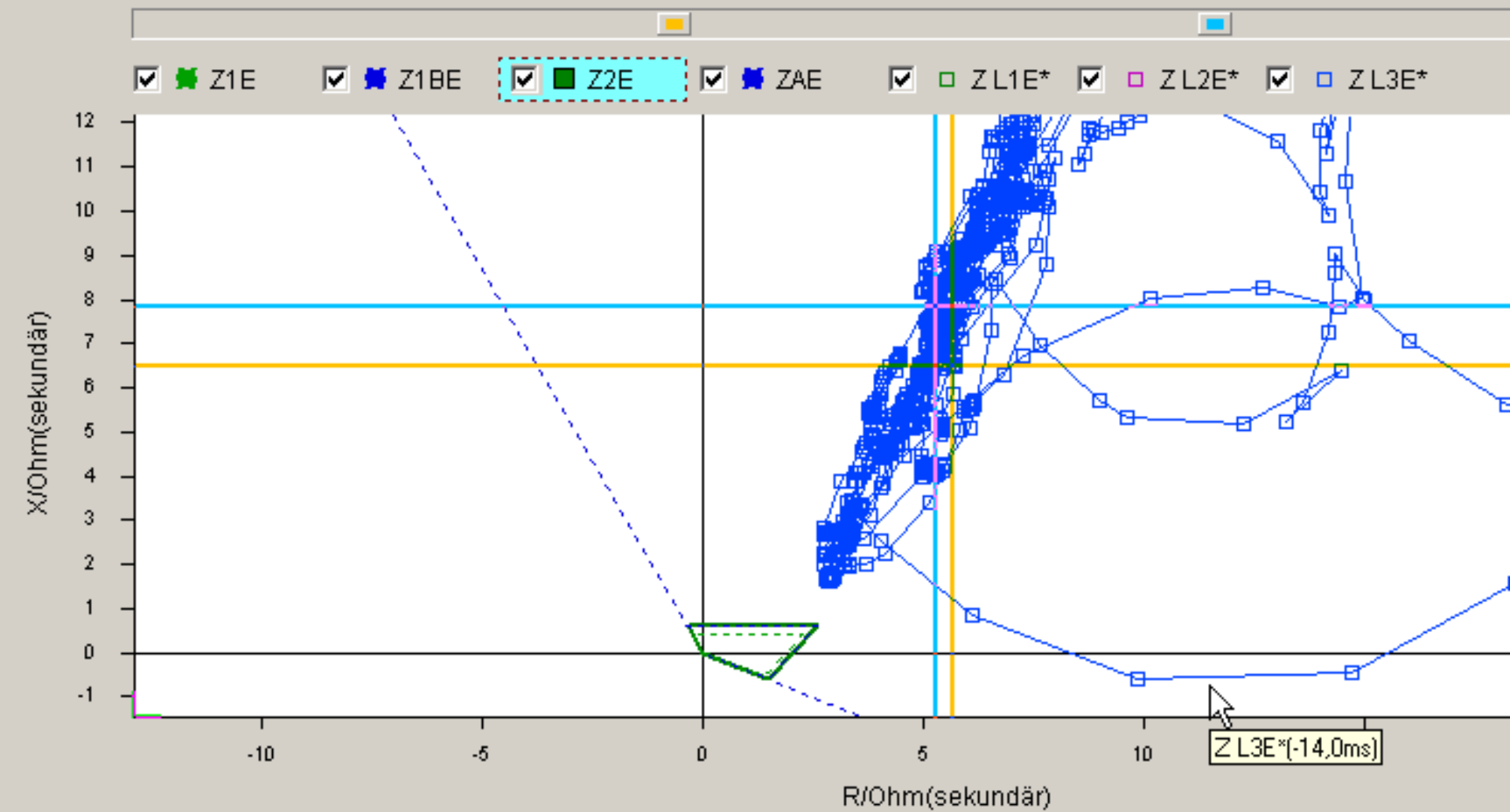
	Time in ms	Measuring Signal	Value	Phase	Real	Imag
Cursor 1:	258.0	None				
Cursor 2:	516.0	None				
C2 - C1	258.0					

Name: Deutschland / 2012 / ErlangerStw Hammersbacherstr. 40225 V4.6.0000
 Filename: C:\DOCUMENTS AND SETTINGS\MOXLE00R\MY DOCUMENTS\VEVE
 Comment:



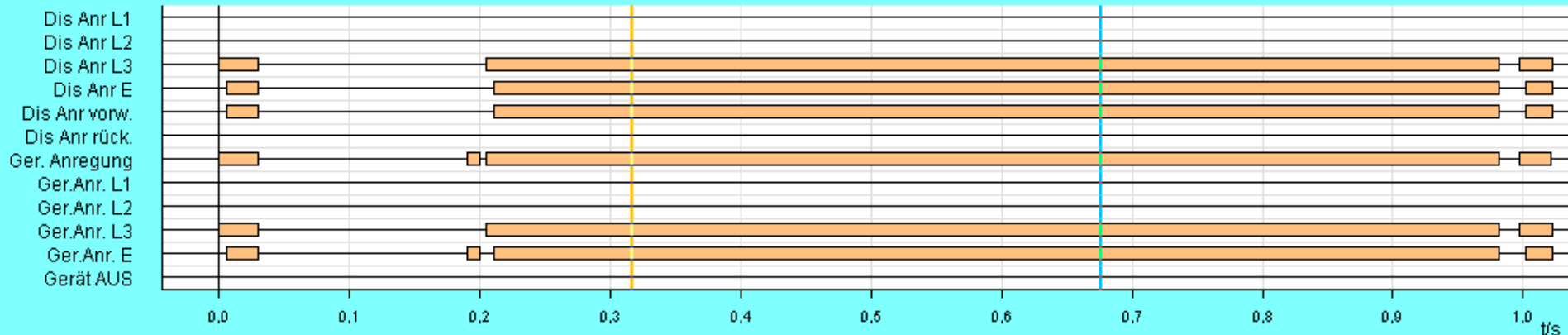
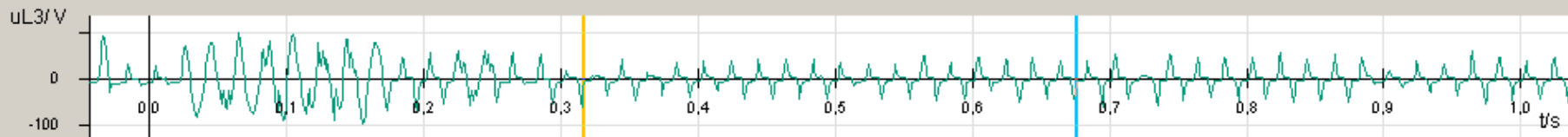
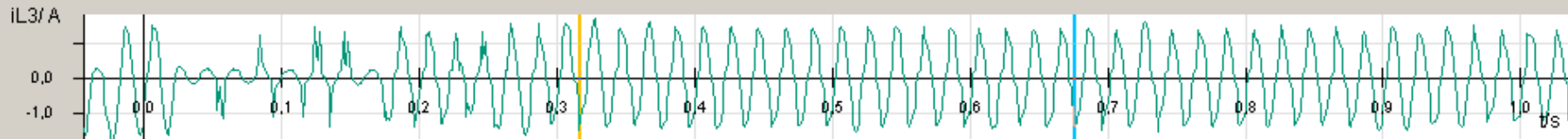
Distance Element Never has a Chance

	t in ms	Meßsignal	Betrag	Phase	Real	Imag
Cursor 1:	316,3	Z L3E*	8,6203 Ohm	48,6°	5,6973 Ohm	6,4692 Ohm
Cursor 2:	676,7	Z L3E*	9,4780 Ohm	55,8°	5,3208 Ohm	7,8436 Ohm

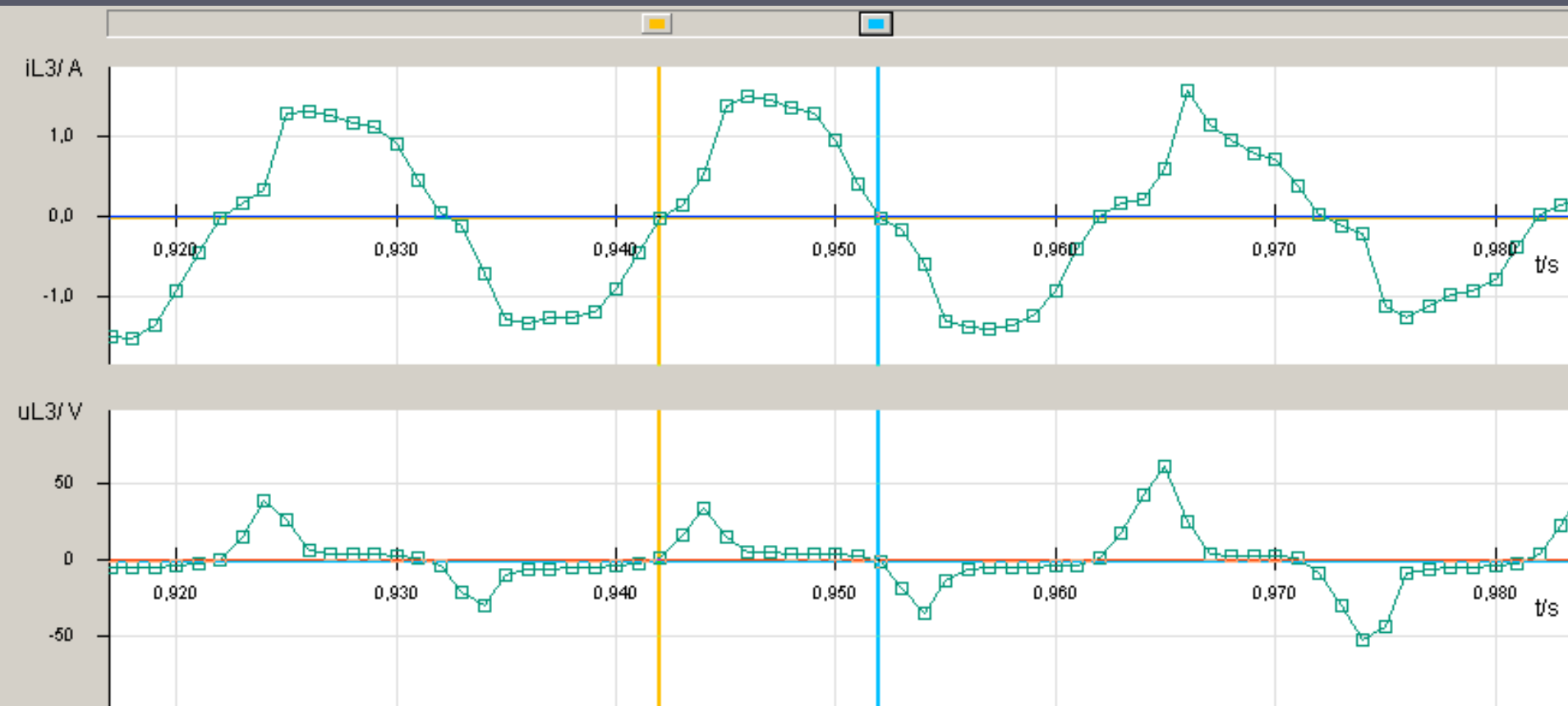


5 Pickups Recorded

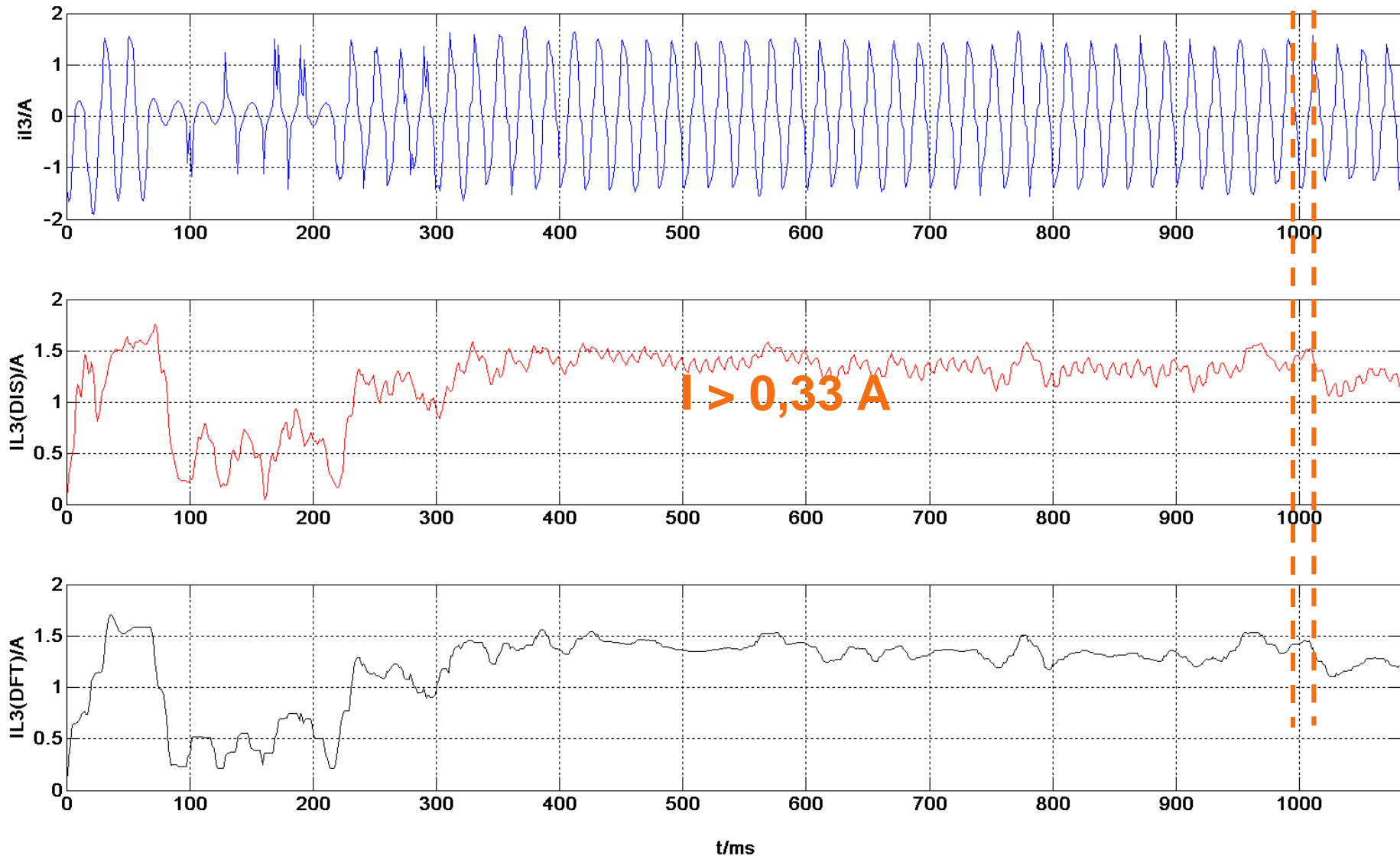
Trigger
15.06.2012
19:26:36.803



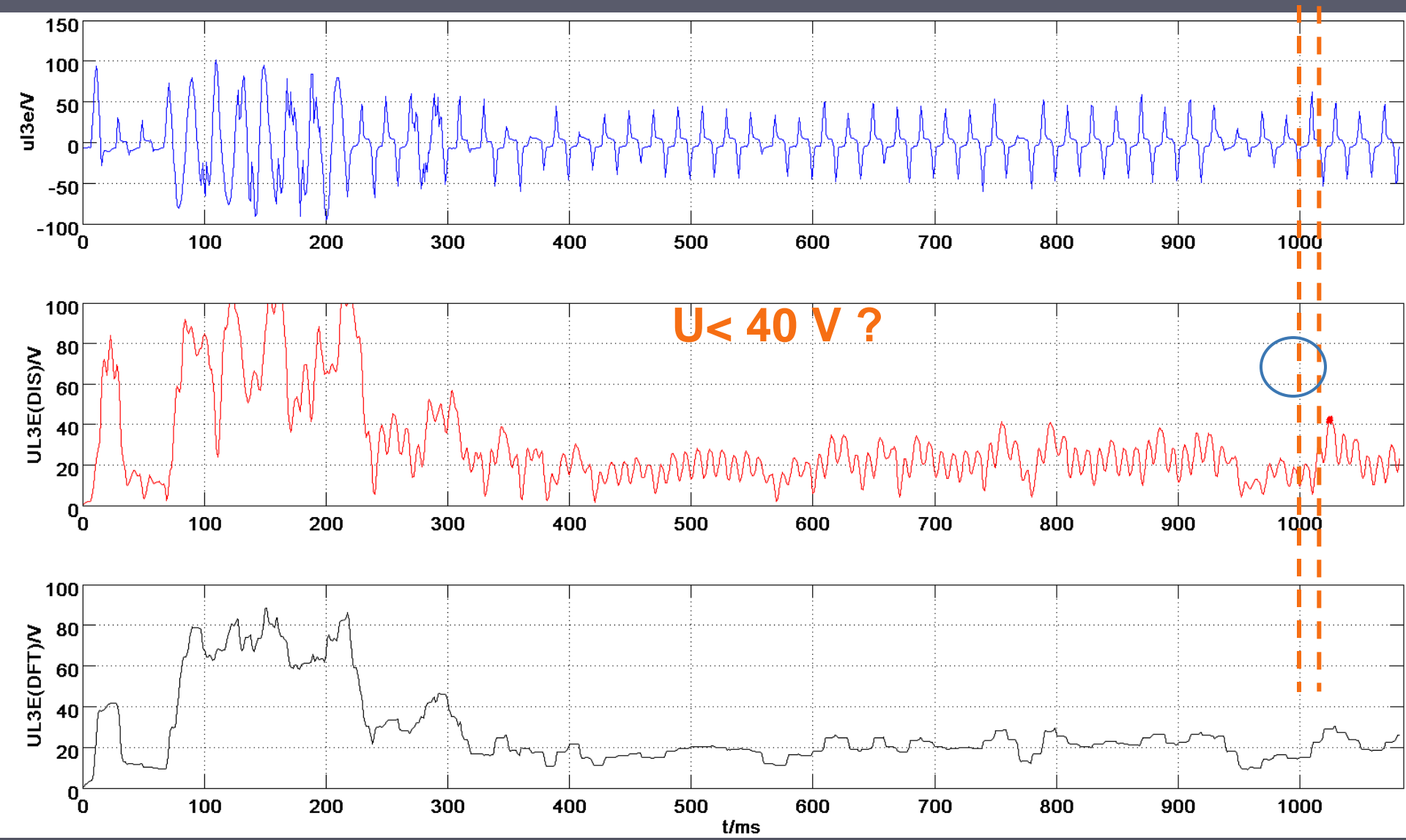
Arc Extinguished at Each Zero Crossing



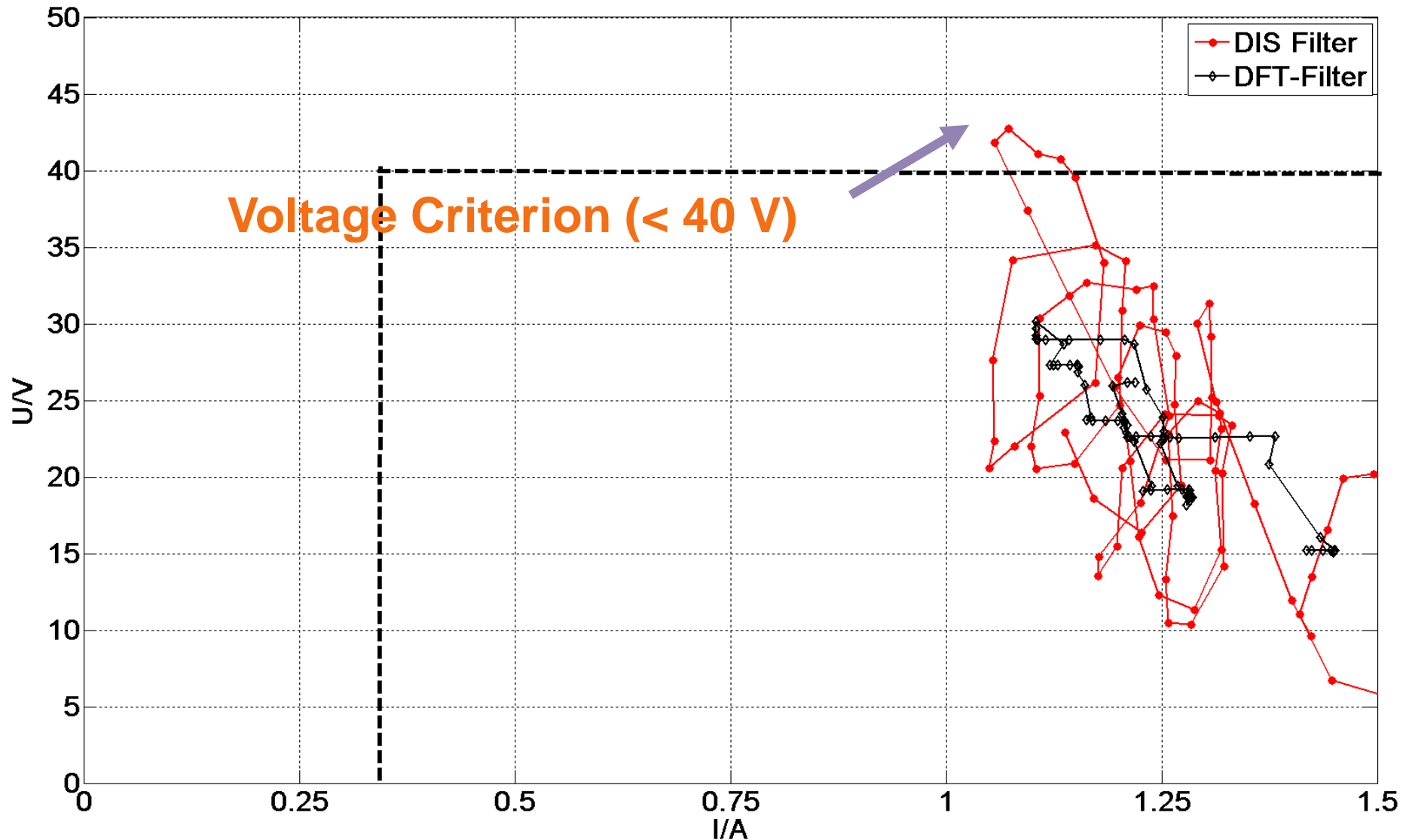
Voltage Restrained Overcurrent



Is Voltage Restraining ?



4/7 outside Characteristic



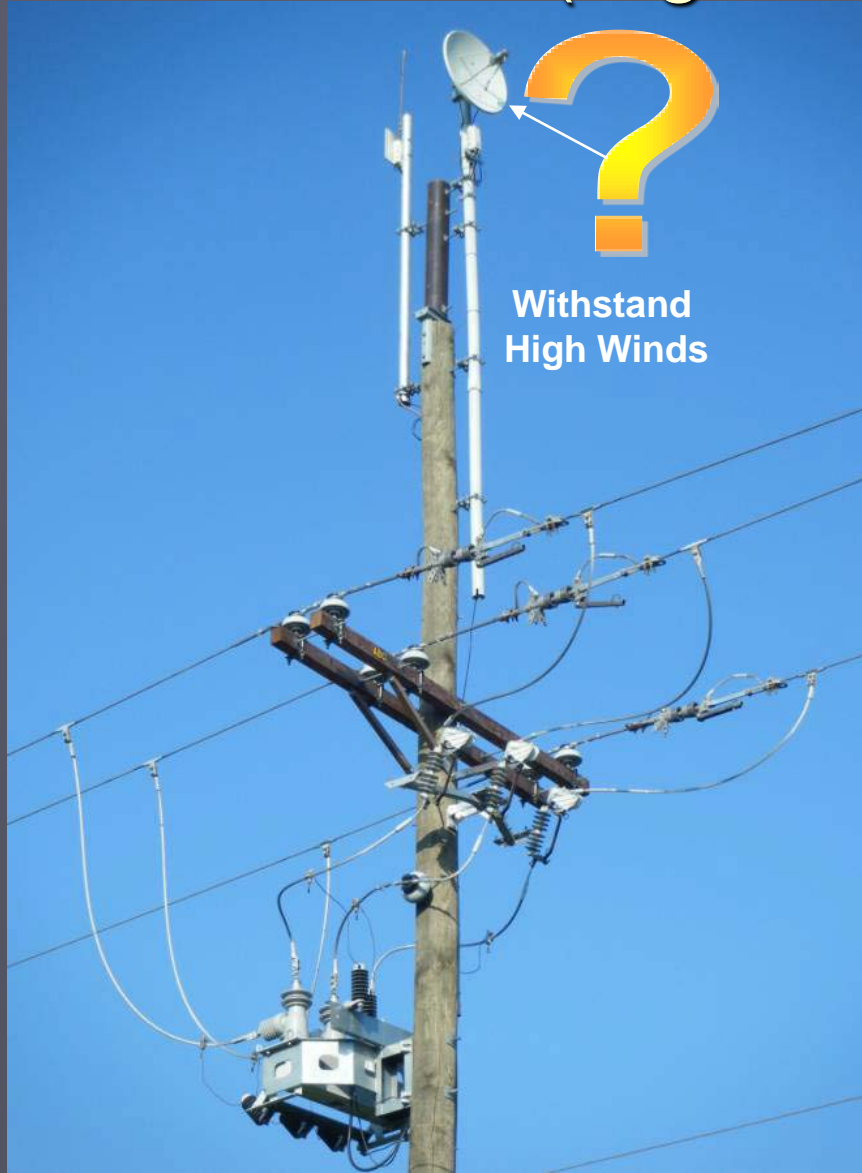
Moral of Story: High Speed Pickup \neq High Speed Dropout



Differential Protection over WiMAX During Hurricane Sandy

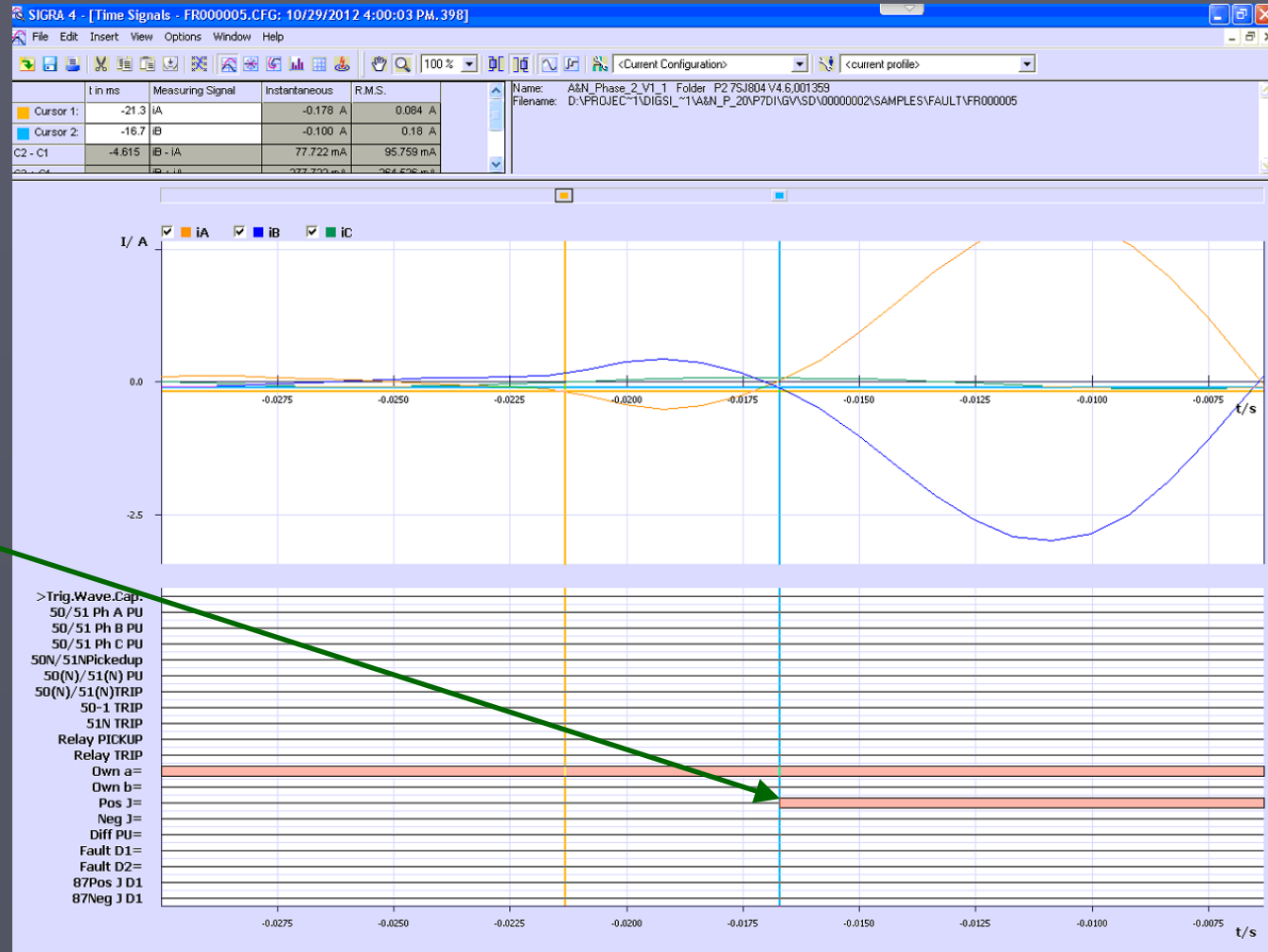


Will New Antenna Withstand High Winds ? (High Gain WiMax)

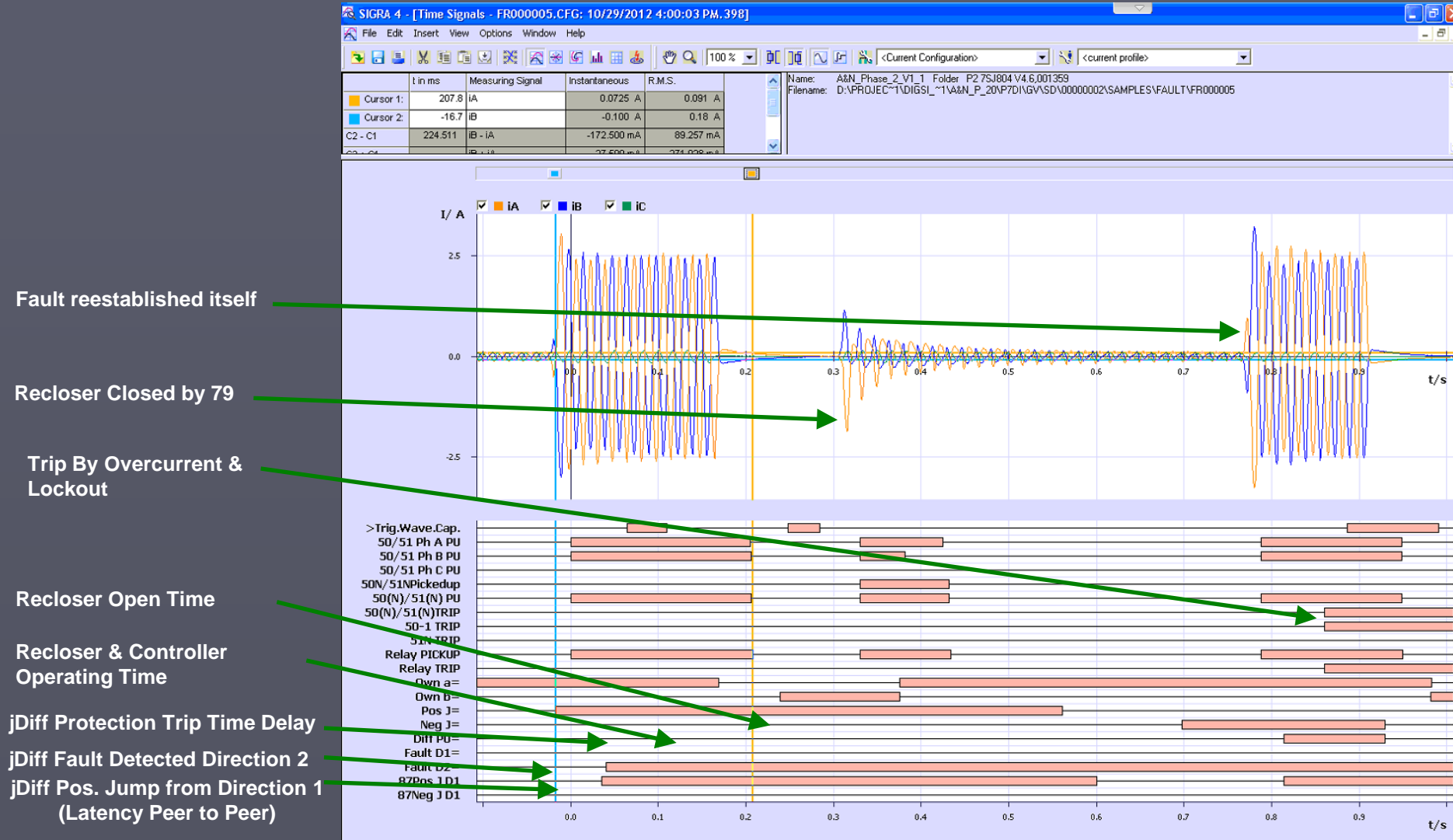


jDiff™ Principle Minimizes Comms *(but they are still there)*

Jump Detector

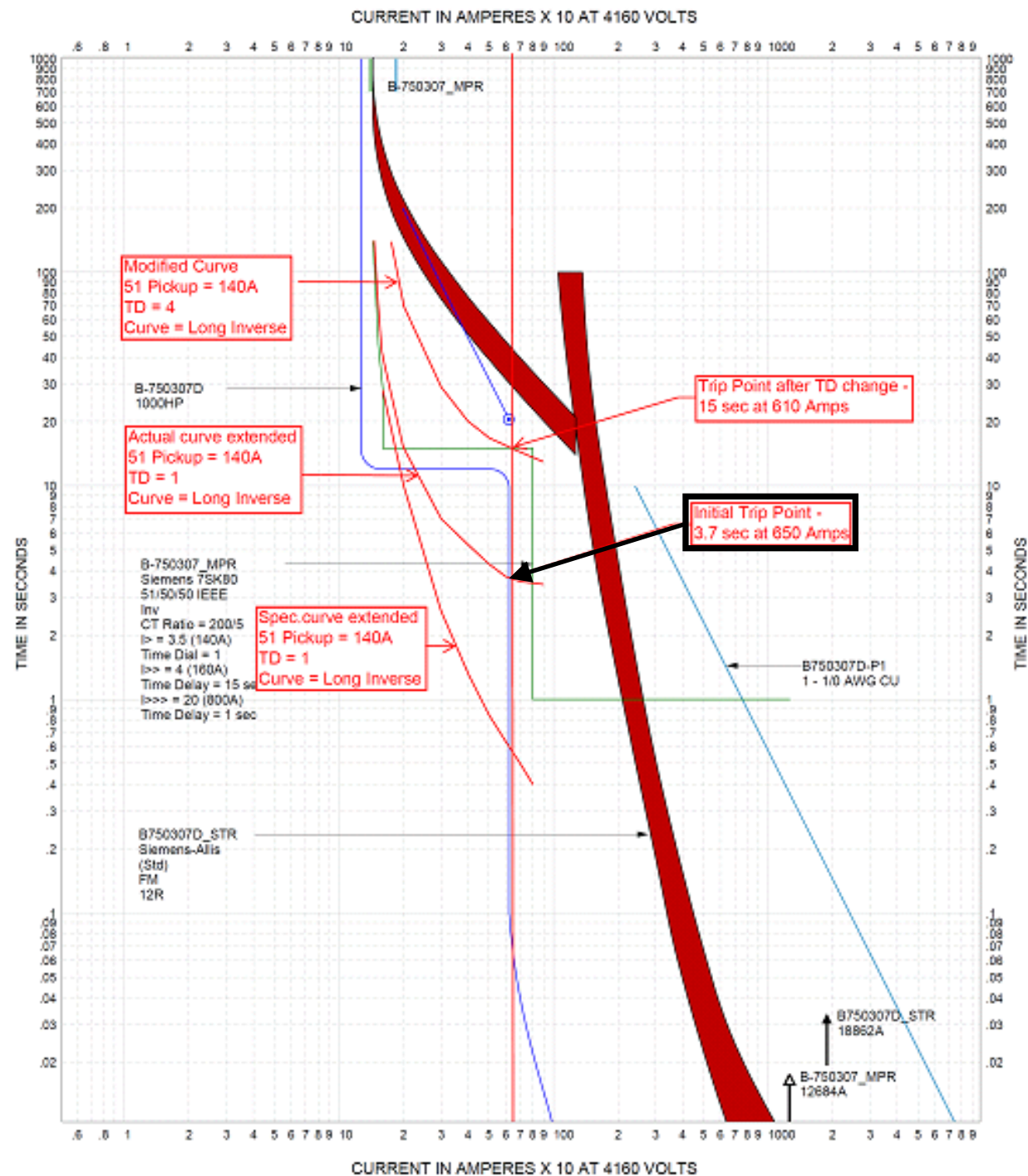


Performance during Hurricane Sandy



Moral of Story: Everything Can Work Right





1000 HP Motor Trips on Startup

Relay “False Trips” Perfectly

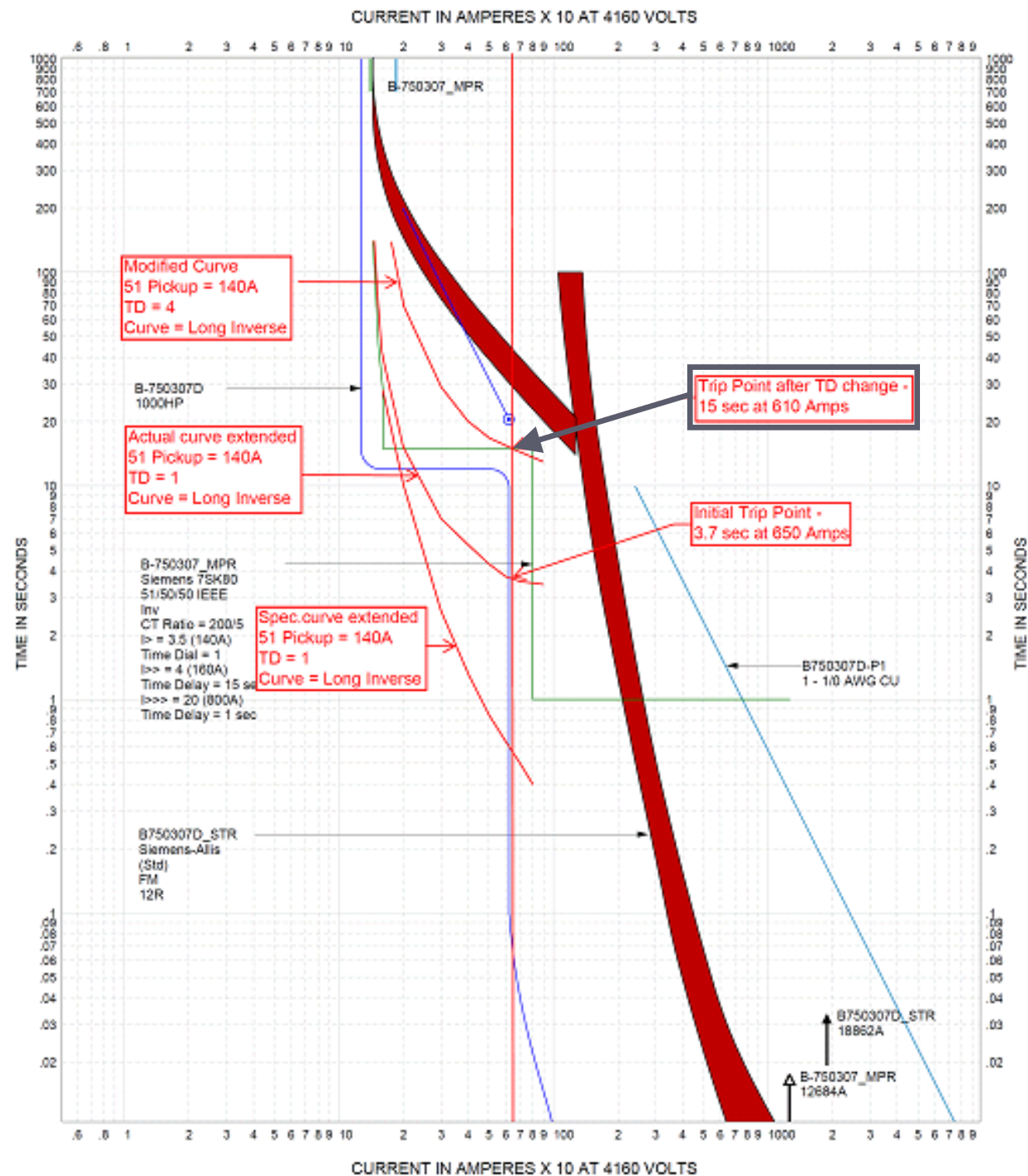
05159	46-2 picked up	ON	60 ms
05159	46-2 picked up	OFF	123 ms
05165	46-1 picked up	OFF	934 ms
00511	Relay GENERAL TRIP command	ON	3701 ms
01791	50(N)/51(N) TRIP	ON	3701 ms
01825	51 TRIP	ON	3701 ms
00533	Primary fault current Ia	0.64 kA	3732 ms
00534	Primary fault current Ib	0.65 kA	3732 ms
00535	Primary fault current Ic	0.65 kA	3732 ms
05165	46-1 picked up	ON	4011 ms
05159	46-2 picked up	ON	4011 ms
01764	50/51 Phase C picked up	OFF	4028 ms
05165	46-1 picked up	OFF	4029 ms
05159	46-2 picked up	OFF	4029 ms
01762	50/51 Phase A picked up	OFF	4036 ms
01763	50/51 Phase B picked up	OFF	4036 ms
01810	50-1 picked up	OFF	4036 ms
01761	50(N)/51(N) O/C PICKUP	OFF	4036 ms
01820	51 picked up	OFF	4037 ms
00301	Power System fault	1 - OFF	14.09.2012 19:08:47.656

Press F1 for Help.

7SK806

V04.62.04

Offline



Raising Curves Slows Pickup but Still Trips.

Moral of Story: A False Trip that Takes Longer – Is Still a False Trip



Customer Replacing Overcurrent with Thermal Element