

Feedwater Heater Drain Cooler Vent Valve Leakage

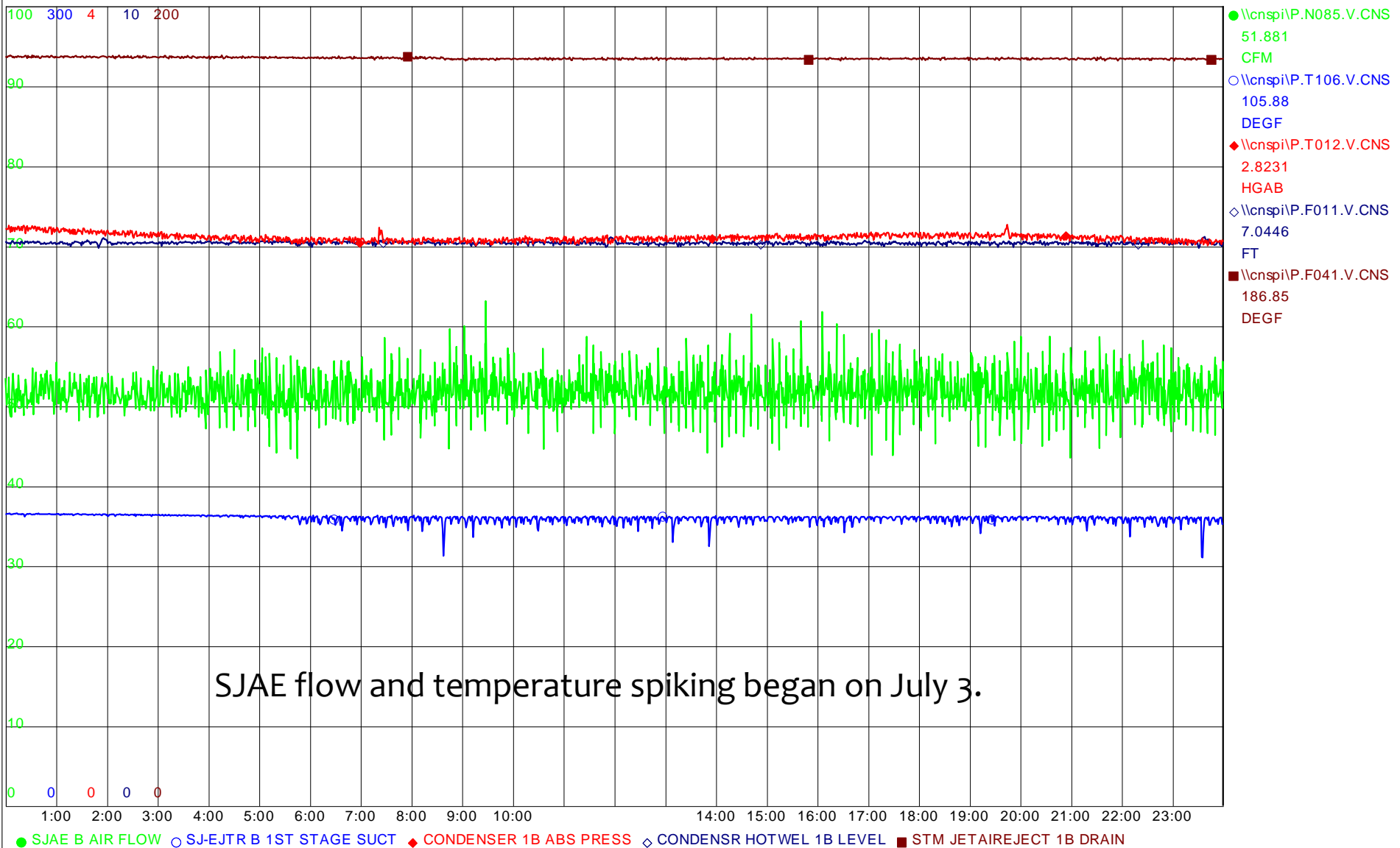
Eric Fulton

NPPD - Cooper Nuclear Station

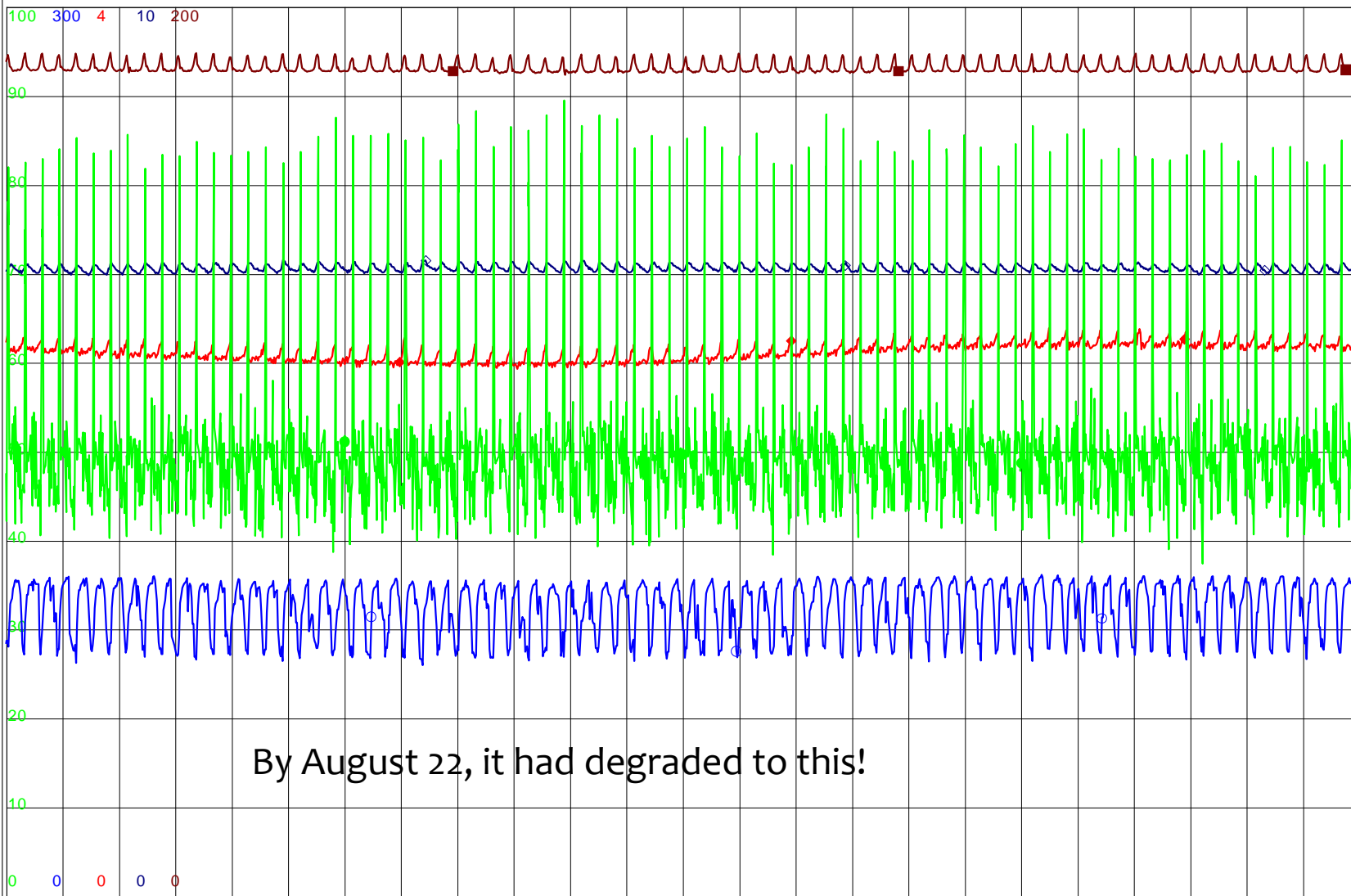
January 2017

Symptoms

- * Started as small SJAE flow and temperature spikes
- * Then it got worse:
 - * SJAE flow oscillations ~45 scfm
 - * SJAE temperature oscillations up to 30°F
 - * Condenser pressure oscillations ~0.15”Hg
 - * Hotwell level oscillations 1-2”



100 300 4 10 200



- \\cnspi\P.N085.V.CNS
81.543
CFM
- \\cnspi\P.T106.V.CNS
86.257
DEGF
- ◆ \\cnspi\P.T012.V.CNS
2.4773
HGAB
- ◇ \\cnspi\P.F011.V.CNS
7.0955
FT
- \\cnspi\P.F041.V.CNS
188.87
DEGF

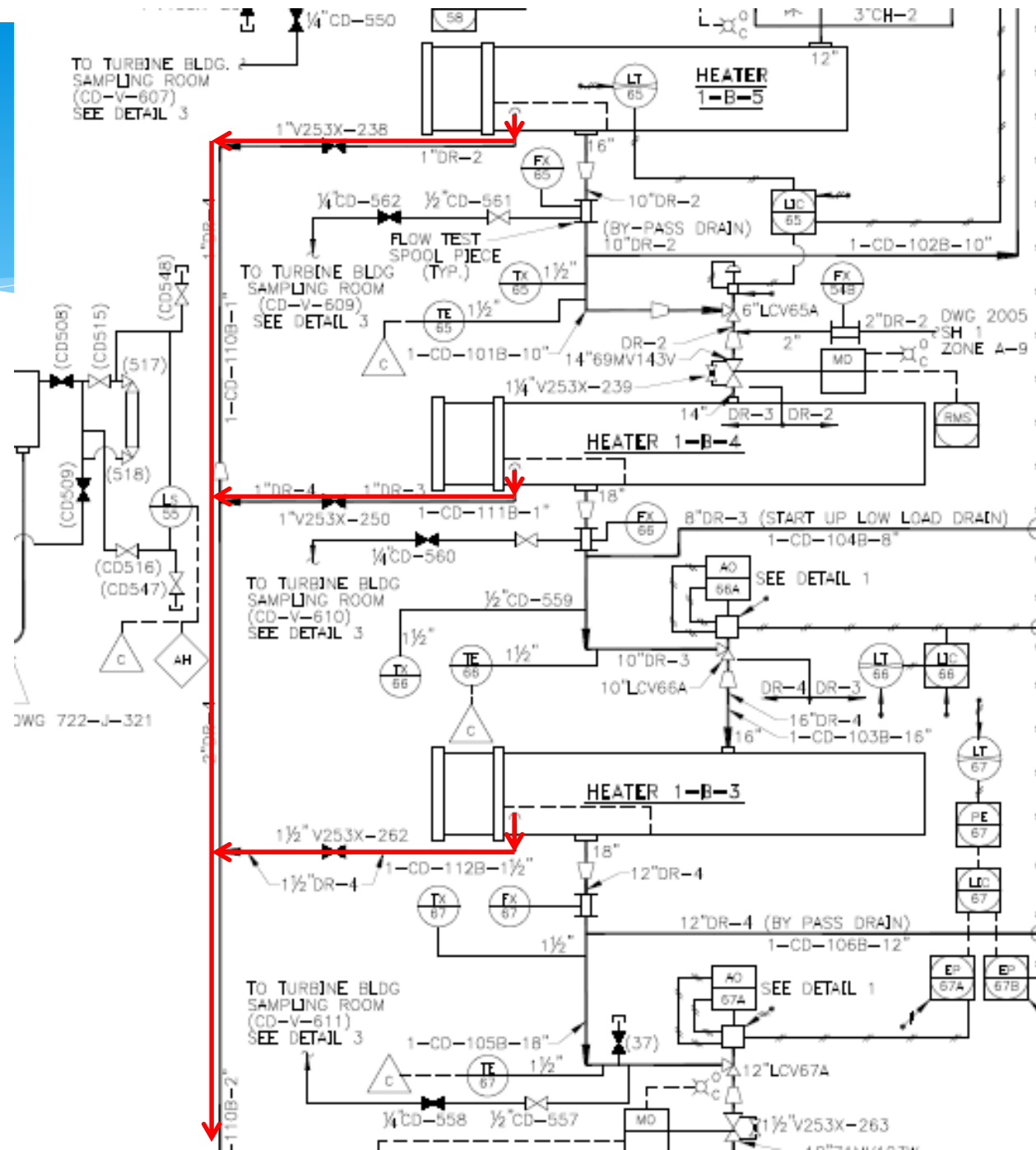
By August 22, it had degraded to this!

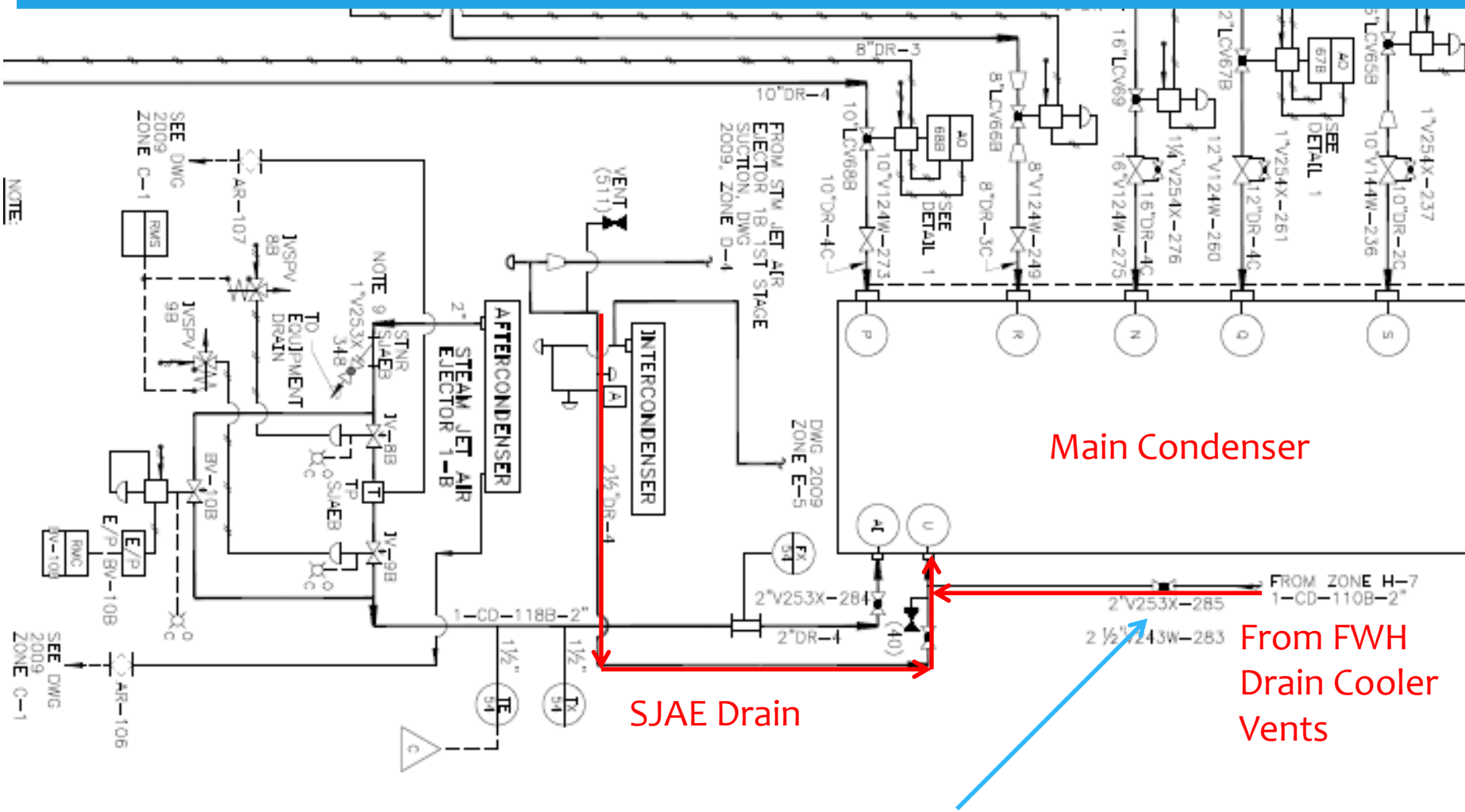
● SJAE B AIR FLOW ○ SJ-EJTR B 1ST STAGE SUCT ◆ CONDENSER 1B ABS PRESS ◇ CONDENSER HOTWEL 1B LEVEL ■ STM JETAIREJECT 1B DRAIN

Investigation

- * Feedwater heater drain cooler vents return to main condenser through SJAE intercondenser loop seal drain
- * Vents are normally closed, only opened for a few minutes during startup
- * Not a problem unless the valves leak by!

Feedwater Heater
Drain Cooler
Vents (open during
startup only)





Closed this normally open valve to isolate drain cooler vents from SJA E

NOTE:

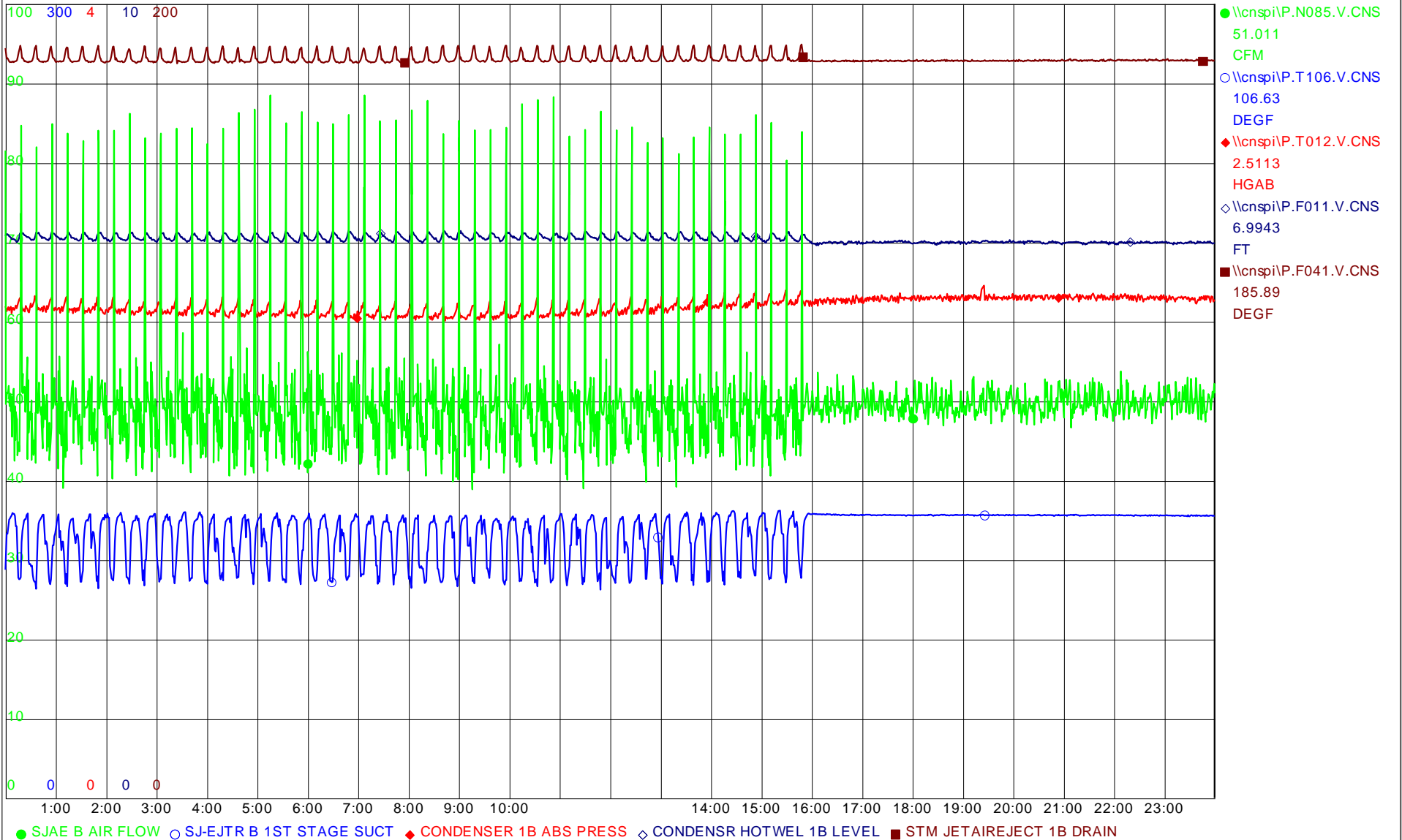
SEE DWG 2009 ZONE C-1
 AR-107
 RWAS

SEE DWG 2009 ZONE C-1
 AR-106
 E/P 1-BW-10B
 RWAS

Main Condenser

SJA E Drain

From FWH
 Drain Cooler
 Vents



Corrective Actions

- * Examined all drain cooler vent valves during next refueling outage
- * Installed temperature elements on piping downstream of each valve for periodic temperature monitoring



11/05/2016 08:58

100



10/04/2016 02:23



10/03/2016 23:34

Conclusion

- * We didn't pay much attention to these valves until this issue occurred
- * Your vents probably don't connect to SJAE's
- * Leakage costs \$\$\$
- * There are better valve designs