

SPD COOLING: STATUS & PLANS UNTIL NEXT T.S.

ROSARIO TURRISI

CURRENT STATUS

LAST EVENTS: HIGHLIGHTS

- **Last TS:**

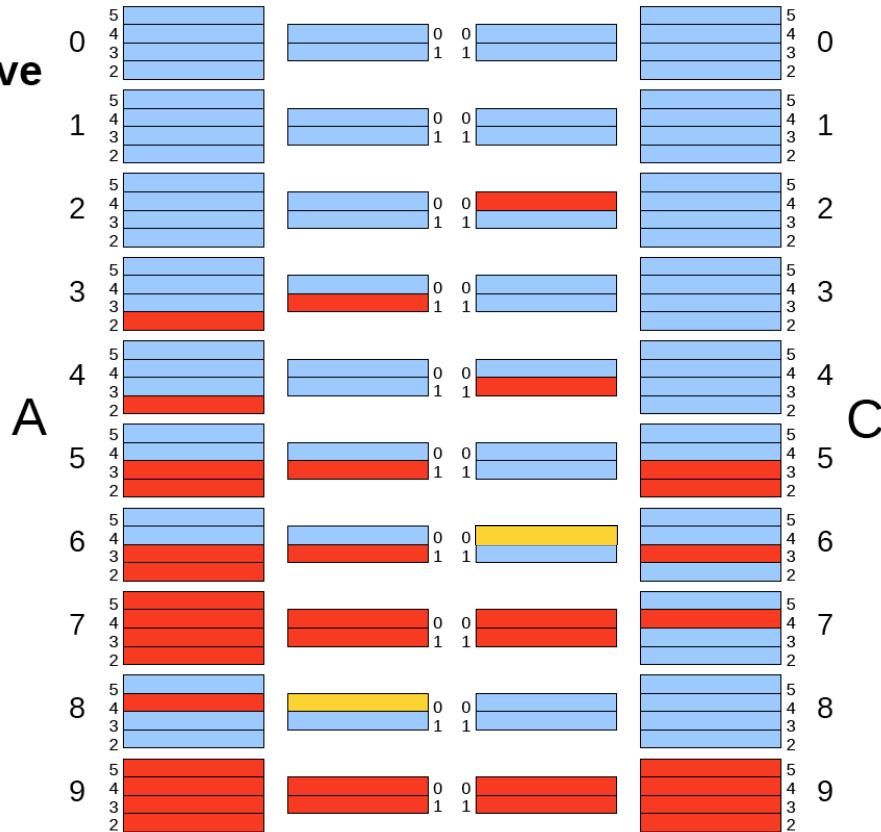
- Counter-flow flushed with C_6F_{14} of sector #6 for 4 days
 - 0.14 g/s gained in flow (from 0.86 to 1.00 g/s) ~ 1 hs more at the same pressure
- Replaced all filters in PP4, 4 sent to
 - SEM analysis results: filters clean
- Re-tuning of liquid pressure (from 5.8 to 6.1 bar abs.)
- 82 hs ready (same as before TS)

- **Pump breakdown**

- same accident after 1 year (was October 2010)
- system restarted with ~0.8 g/s less flow (13.5 → 12.7)
- 5 hs missed the restart, 77 hs ready=64%

MAP OF MODULES

■ 82 active
■ 38 off
■

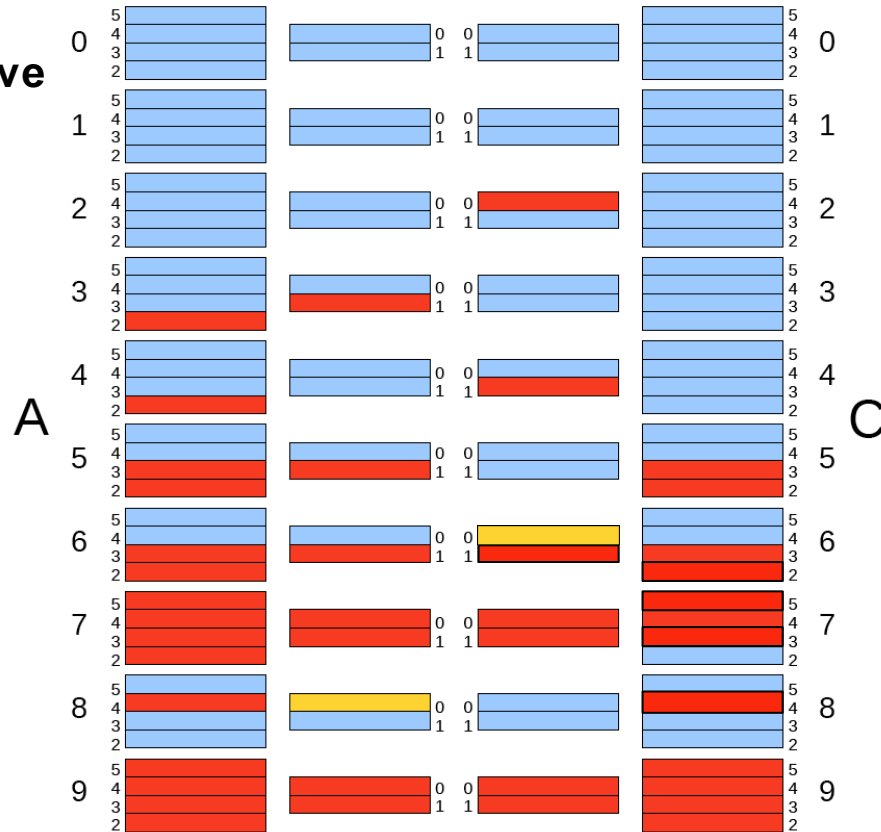


**Before last alarm
(after tech stop)**

8A0: communications problems, under investigation

MAP OF MODULES

■ 77 active
■ 43 off
■



Current situation

8A0: communications problems, under investigation

T.-D. CONDITIONS

Flow before and after the alarm (and something else):

SECTOR	BEFORE	AFTER	TREND	HS READY	HS +/-	ΔP PP4	Q.I.
0	2.00	2.05	+0.05	12	0	+0.13	◆
1	2.03	1.98	-0.05	12	0	0	◆
2	2.00	2.00	0.00	11	0	+0.14	◆
3	1.34	1.26	-0.08	10	0	0	◆
4	1.41	1.35	-0.06	10	0	0	◆
5	1.06	1.02	-0.04	7	0	0	◆
6	1.00	0.84	-0.16	5	-2	+0.05	◆
7	0.55	0.39	-0.16	1	-2	0<0.05	◆
8	1.71	1.51	-0.20	9	-1	+0.08	◆
9	0.37	0.29	-0.08	0	0	0	◆
TOTAL	13.47	12.69	-0.78		-5		

Legenda:

ΔP PP4= pressure variation in PP4 after the alarm

Q.I.= quality index (in the return)

◆ plenty of liquid

◆ limited amount of liquid

◆ traces or no liquid

(from the temperature in the return)

HINTS WE SEE

1. The hs gone off had the counterpart hs already off
2. Highest Δp on “good” sectors, 0 & 2
3. Worst flow drop on sector #8, but no big pressure change in PP4
4. Completely lost the recovery of flow on sector #6

From 3), 2) seems that no further clogging is affecting the (already bad) sectors (impedance stays the same).

Btw, a higher pressure in sectors #0, #2 may be a hint of bad surprises in the near future.

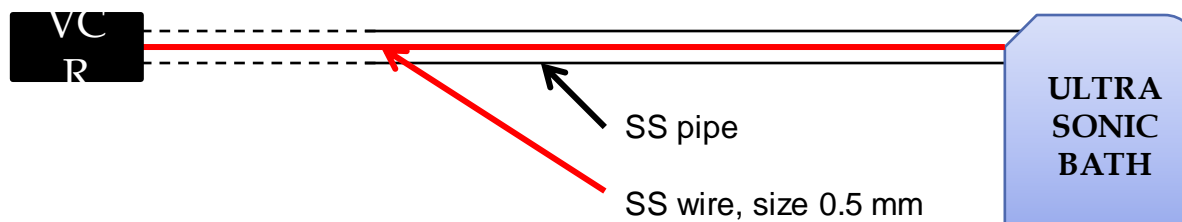
The flow/pressure does not tell all the story: at “violent” stops restart conditions are determined by “something else”

Next t.s. should try to restart from scratch (from vacuum).

ULTRASOUNDS SOLUTIONS

ULTRASOUNDS SOLUTION - 1

- Ultrasounds bath 8 kW, variable frequency, at CERN under test now
- 1st test with C_6F_{14} not satisfactor, cavitation doesn't seem to happen outside the tank
- Test w/water more promising
 - it's dangerous to put water in the lines, we'll try with another fluid e.g. C_8F_{18}
- "The" test: put clogged filters at the VCR and try different cleaning times
 - the filters are characterized individually (pressure drop vs. flow)
 - a stainless steel wire (0.5 mm) is inserted the pipe from the u.s. bath to the vcr in order to better propagate u.s.



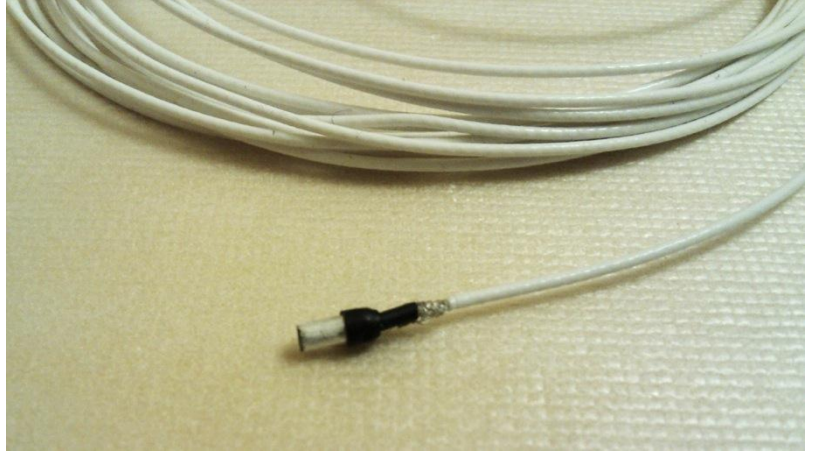
U.S. BATH



ULTRASOUNDS SOLUTION – 2

Generate the ultrasounds close to the filter with piezoceramics.

- **Assemblies done, tested a few times to go inside a pipe replica of the one connecting PP4 to PP3**
 - The assemblies seem strong enough to go back and forth inside the pipe without producing any debris
 - a kind of resin is under test to build a protective layer on the ceramics
- **No feedback from companies concerning the power supply**
- **A few interesting (and doable) hints:**
 - micro power supplies from Matusada (but they produce generators dedicated to piezoceramics too...)
 - pulser + amplifier in stock at the EP here at CERN
 - main issue: measure the impedance vs. frequency of the piezoceramics assembly



PLANS UNTIL NEXT T.S.

4 weeks left (this included), 41-44

Finer details results-driven

- #41
 - characterization of filters
 - test of u.s. bath with water
 - measure effect on clogged filter as a function of time, need 4-5 tests from 12 to 1/2 hours
- #42
 - test with water cont'd
 - start test u.s. bath with alternative fluid
 - test power up of piezoceramics ← get support from a technician (S. Martini)
- #43
 - test with alternative fluid cont'd
 - if time enough, try cleaning with piezoceramics
 - test of u.s. bath with dummy sector
- #44
 - is a test with sector #11 thinkable here?
 - test disassembly/reassembly of u.s. bath, mandatory to bring it to PP4
 - refine details of u.s. tests if needed

All this holds if any positive result, of course...