



# P2 events & perturbations

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# Overview

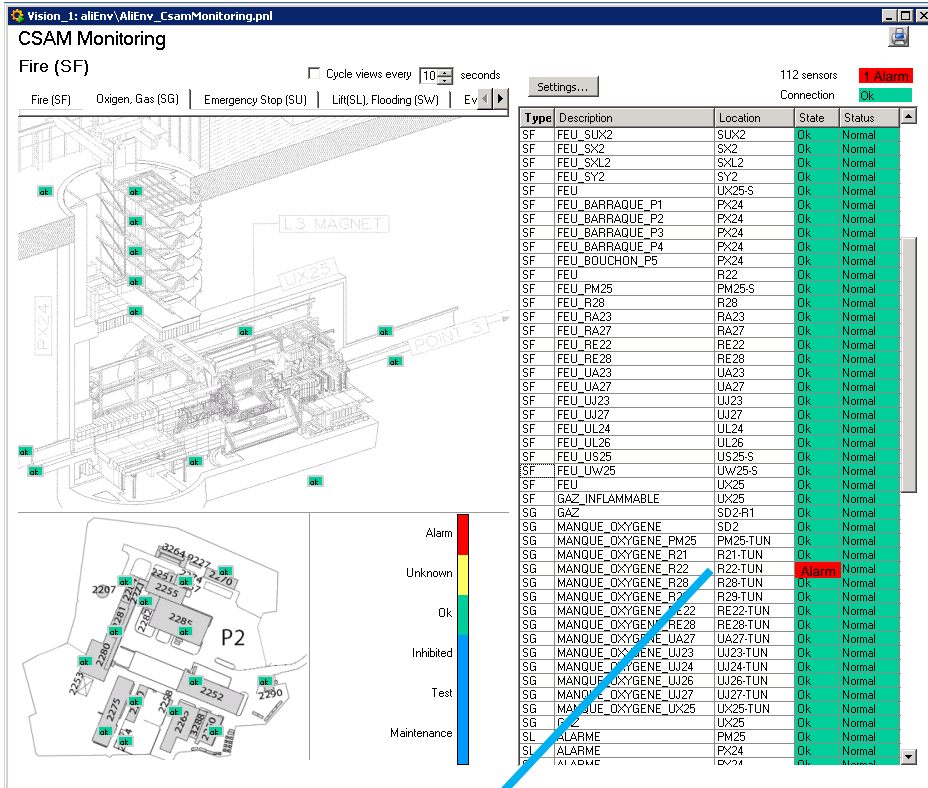
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- 27.04 : ODH alarm sector 1-2
- 28.04 : Power glitch
- 01.05 : Trip solenoid magnet
- 02.05 : Power glitch
- 04.05 : Cooling water stop

# 27.04 : ODH alarm S1-2

- 15:44 – CSAM alarm: “Manque Oxygen R22”

- During technical stop
- Arrival fire-brigade for inspection in tunnel
- Evacuation in tunnel, no evacuation in ALICE cavern
- Access to cavern suspended (signal at top of lift & request firebrigade)
- ~17:00 – Fire-brigade finishes inspection; green light from to continue access to ALICE cavern



The screenshot shows the 'CSAM Monitoring' software interface. On the left is a 3D model of the cavern with various sensors marked. On the right is a table of sensor status. A legend below the model indicates alarm levels: Alarm (red), Unknown (yellow), Ok (green), Inhibited (blue), Test (light blue), and Maintenance (dark blue). A blue arrow points from the 'MANQUE OXYGENE R22' entry in the table to the 3D model.

Type	Description	Location	State	Status
SF	FEU_SUX2	SUX2	Ok	Normal
SF	FEU_SY2	SY2	Ok	Normal
SF	FEU_SY2	SY2	Ok	Normal
SF	FEU	UX25-S	Ok	Normal
SF	FEU_BAPRAQUE_P1	PX24	Ok	Normal
SF	FEU_BAPRAQUE_P2	PX24	Ok	Normal
SF	FEU_BAPRAQUE_P3	PX24	Ok	Normal
SF	FEU_BAPRAQUE_P4	PX24	Ok	Normal
SF	FEU_BDOUCHON_P5	PX24	Ok	Normal
SF	FEU	R22	Ok	Normal
SF	FEU_PM25	PM25-S	Ok	Normal
SF	FEU_R28	R28	Ok	Normal
SF	FEU_RA23	RA23	Ok	Normal
SF	FEU_RA27	RA27	Ok	Normal
SF	FEU_RE22	RE22	Ok	Normal
SF	FEU_RE28	RE28	Ok	Normal
SF	FEU_UA23	UA23	Ok	Normal
SF	FEU_UA27	UA27	Ok	Normal
SF	FEU_UJ23	UJ23	Ok	Normal
SF	FEU_UJ27	UJ27	Ok	Normal
SF	FEU_UL24	UL24	Ok	Normal
SF	FEU_UL26	UL26	Ok	Normal
SF	FEU_US25	US25-S	Ok	Normal
SF	FEU_UW25	UW25-S	Ok	Normal
SF	FEU	UX25	Ok	Normal
SG	GAZ_INFLAMMABLE	UX25	Ok	Normal
SG	GAZ	SD2-R1	Ok	Normal
SG	MANQUE_OXYGENE	SD2	Ok	Normal
SG	MANQUE_OXYGENE_PM25	PM25-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R21	R21-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R22	R22-TUN	Alarm	Normal
SG	MANQUE_OXYGENE_R28	R28-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R28	R28-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R22	RE22-TUN	Ok	Normal
SG	MANQUE_OXYGENE_RE28	RE28-TUN	Ok	Normal
SG	MANQUE_OXYGENE_UA27	UA27-TUN	Ok	Normal
SG	MANQUE_OXYGENE_UJ23	UJ23-TUN	Ok	Normal
SG	MANQUE_OXYGENE_UJ24	UJ24-TUN	Ok	Normal
SG	MANQUE_OXYGENE_UJ26	UJ26-TUN	Ok	Normal
SG	MANQUE_OXYGENE_UJ27	UJ27-TUN	Ok	Normal
SG	MANQUE_OXYGENE_UX25	UX25-TUN	Ok	Normal
SG	GAZ	UX25	Ok	Normal
SL	ALARME	PM25	Ok	Normal
SL	ALARME	PX24	Ok	Normal
SL	ALARME	UX25	Ok	Normal

SG	MANQUE_OXYGENE_PM25	PM25-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R21	R21-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R22	R22-TUN	Alarm	Normal
SG	MANQUE_OXYGENE_R28	R28-TUN	Ok	Normal
SG	MANQUE_OXYGENE_R28	R28-TUN	Ok	Normal

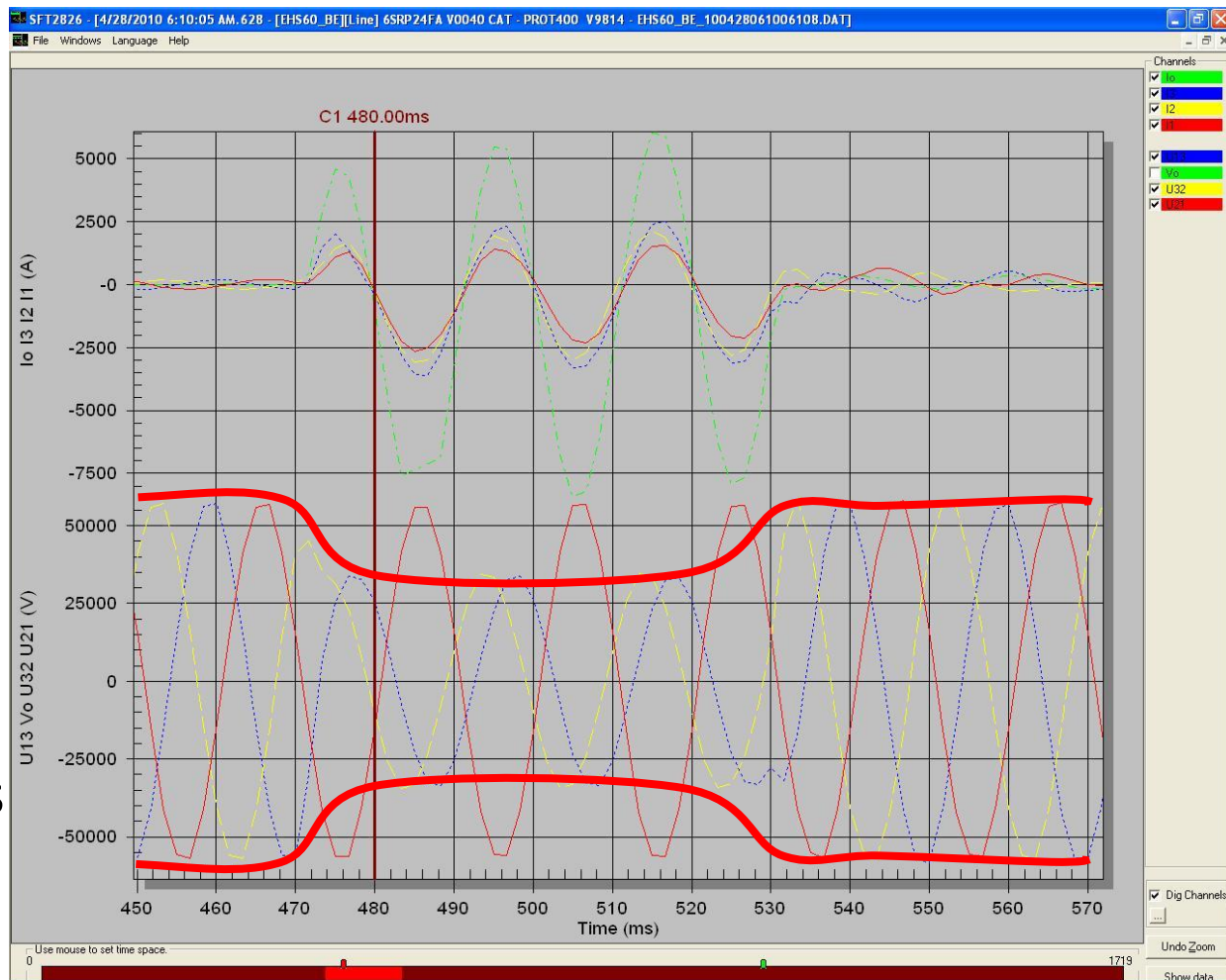


## 27.04 : ODH alarm S1-2

- Cause:
  - Perturbation in CPU of 'centrale gaz' (still under investigation)
- Impact for ALICE:
  - No direct impact on ALICE installations
  - Only perturbation: access to cavern was suspended for ~1 h
- Remarks:
  - Some confusion: no access, but no evacuation
  - At some point decided to inform people in cavern, and suggest them to leave if activity allowed. Had some difficulties to reach all people in cavern.
- Actions:
  - Confirmed: "no access, but no evacuation" is correct
  - Re-enforce procedure on how to people in cavern (leave phone number, carry and answer phone)

# 28.04 : power glitch

- 06:10 : short power glitch at P2 (and rest of CERN)
- Many detector equipment tripped off
- All detectors were called to recover their systems
- Most services recovered by piquets (local or remote)





# 28.04 : power glitch

## ■ Cause:

- Short circuit on 400kV network supplying CERN (RTE: “Une activité avifaune serait à l’origine de ce court-circuit”)

## ■ Impact for ALICE:

- Many detector equipment tripped off
- Many services (cooling, ventilation) off
- Part of 18kV filter (SVC) off

*SVC: Static Var Compensator*

## ■ Remarks:

- During access, magnets were off (would have tripped), and access for verification was possible
- Relatively smooth recovery, no damage reported
- Filter switched on transparently (only TCR)

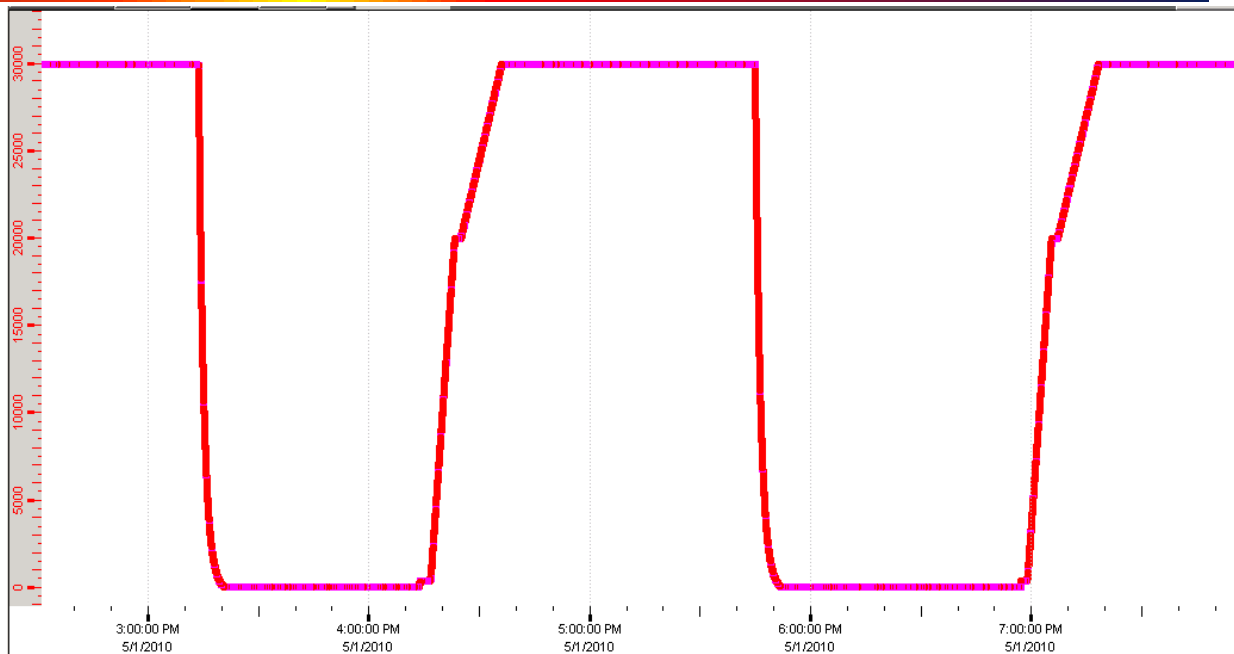
*TCR: Thyristor Controlled Reactor*

## ■ Actions:

- None

# 01.05 : trip solenoid

- 15:13 – fast trip of solenoid magnet
- Piquet changed fuse on T reading system, ramp up ~16:20
- 17:45 – fast trip of solenoid magnet
- Disabled part of T reading system, ramp up ~19:00





# 01.05 : trip solenoid

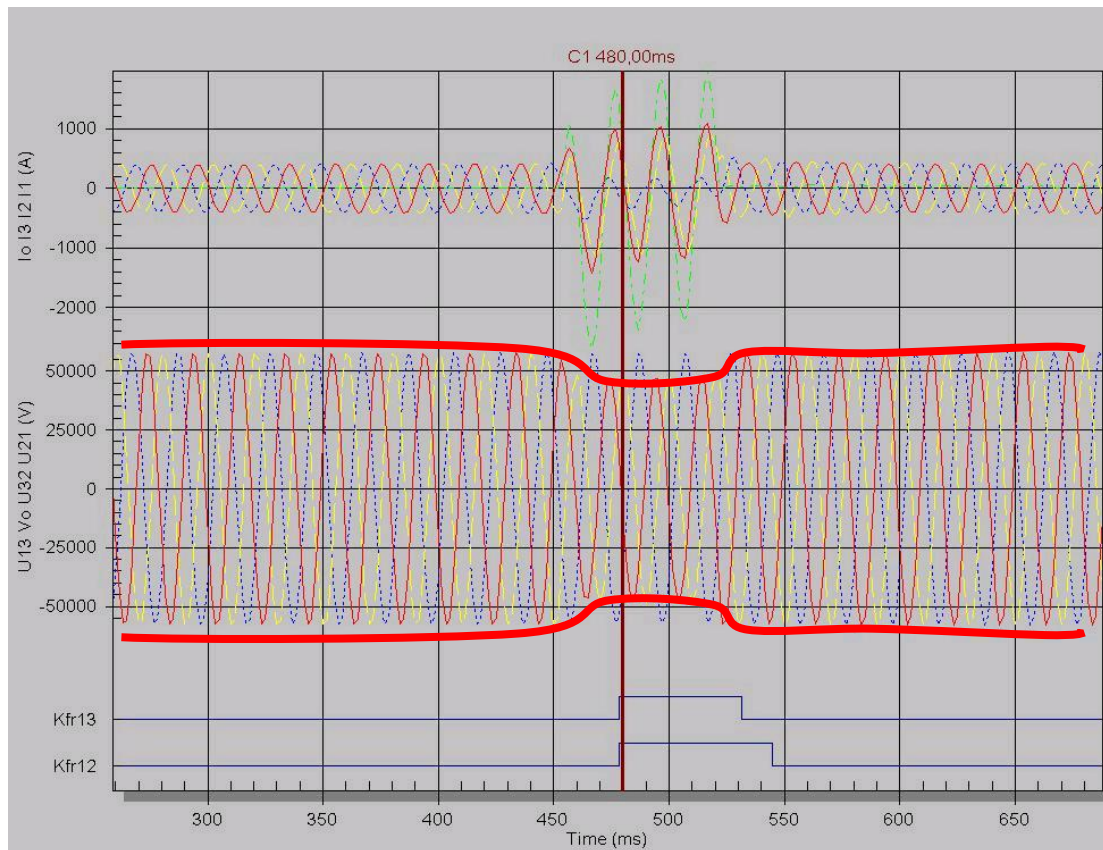
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- Cause:
  - Failing temperature reading
- Impact for ALICE:
  - No data lost (no physics beams)
- Remarks:
  - none
- Actions:
  - Collect feedback magnet piquet



# 02.05 : power glitch

- 02:59 : short power glitch at P2 (and rest of CERN)
- Beams lost, dipole magnet tripped, TRD HV crates off
- TRD recovered by expert (~4:00), magnet by piquet. Ramped up at ~05:10.





## 02.05 : power glitch

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- Cause:
  - Short circuit on 400kV network supplying CERN (thunderstorm, close to Genissiat)
- Impact for ALICE:
  - Dipole magnet and TRD HV crates off
- Remarks:
  - Relatively small perturbation for ALICE
  - No damage reported
- Actions:
  - None



## 04.05 : cooling water stop

- 10:24 – stop of cooling towers at P2
  - Stop of LHC cryo
  - Stop of both magnets
  - Trip of 18kV compensator
  - Slow rise in temperature of mixed water
    - CRs switched over to 'backup cooling'
  - Advised detectors to switch off water cooled equipment (or at least to keep a close eye on temperatures)
- ~11:00 - CCC/TI asks for green light to switch on SVC
  - Need to shut down non-UPS part of DAQ and HLT
- 11:50 – OK to switch compensator
- 12:00 – Compensator OK, confirmation cooling OK
  - Switch on again



# 04.05 : cooling water stop

- Cause:
  - Stop of point 2 cooling towers, due to fuse in control cabinet (human error)
- Impact for ALICE:
  - Both magnets off
  - Major reduction in cooling power (graceful switch off of detector equipment)
  - Shutdown of DAQ and HLT for compensator switch-on
- Remarks:
  - Major impact on LHC; cryo back only during the night
  - Problem restarting solenoid
    - Magnets were 'ready' at ~13:00, problem only discovered at ramp late evening
    - Could have been identified and fixed by doing 'test ramp' in the afternoon
  - No damage reported
- Actions:
  - Refine procedure for switch-on of compensator (already in preparation)
  - ALICE should insist in doing test ramp of magnets after fast trip



# Summary

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- Several 'incidents' in last 10 days
- No damage reported
- Improve documentation/instructions and procedures

