
RELIABILITY OF THE COOLING AND VENTILATION INSTALLATIONS FOR THE INJECTORS

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THANKS TO TI AND CV PEOPLE

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- ✘ Overview of the run 2009 for CV
 - ✘ Major improvements in 2009
 - Water treatment
 - Demineralised water production
 - Cooling control
 - ✘ Major concerns for the future
 - + Reject water treatment
 - + PS Ventilation and Linac 3 cooling
 - + North area ventilation and chilled water
 - ✘ Conclusion

2009 MAJOR EVENTS FOR PS COOLING

Cooling station	Availability for beam	Problem
LINACS + LEIR	<100 %	22/09 wrong connexion in the cubicle → 1h10
LINAC 2	100 %	
LINAC 3	<100%	Several problems with the PS chilled water circuit
BOOSTER	100%	23/4 Leak on the user side → 6h55
PS Magnet	100%	
PS Central Bldg	100%	
PS thyristor	100%	
Isolde	100%	
Isolde target	100%	
AD	<100%	<ul style="list-style-type: none"> • In June, two leaks on the user side → 9h00 • 05/09 broken motor of a secondary pump: 1h16
EAST area	100%	
CTF3	100%	

2009 MAJOR EVENTS FOR SPS COOLING

Cooling station	Availability for beam	Problem
BEQ2	100 %	
BEQ3	100 %	
BA1	100 %	
BA2	<100 %	2/11 PLC power supply → 1h40
BA3	100%	
BB3	100%	
BA4	100%	
BA5	100%	
BA6	<100%	03/08 faulty leak detection sensor → 3h02
CNGS	100%	
BA80	100%	
BA81	100%	
BA82	100%	
TCC8	100%	

OTHER CV EQUIPMENTS AFFECTING THE BEAM TIME

- ✘ PS Chilled water failures
 - + Leaks difficult to repair (very rusty + asbestos)
 - + Lack of pressure for the cooling of Linac 3 source

- ✘ The 5th of August reject pipe blocked for the sump in TT6 → several access and stops (10/10, 19/10) needed to fix the temporary solution implemented during technical stops

- ✘ The 27th of September: belt broken for the ventilation of the CNGS Target area. → 21h50

- ✘ North area :
 - + Important leak for the chilled water circuit
 - + Ventilation of the EHN1 Barracks : lack of spare parts and regulation not compatible with the present needs of the user.

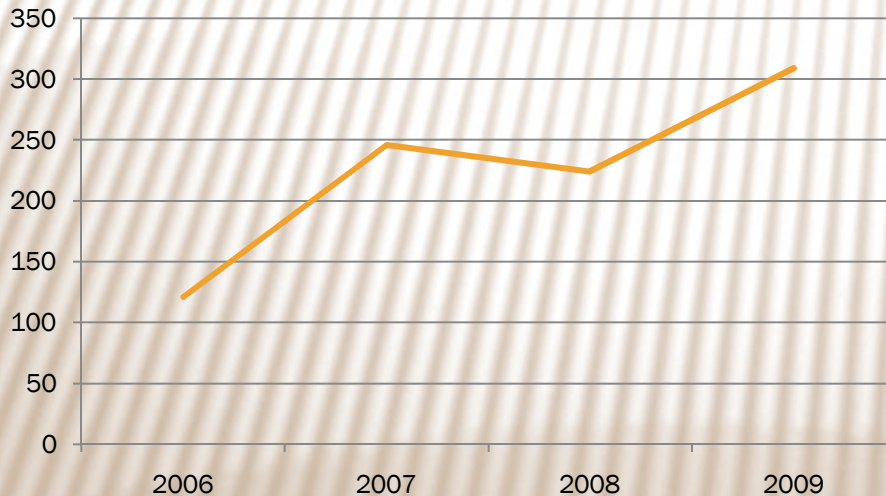


MAJOR IMPROVEMENT IN 2009

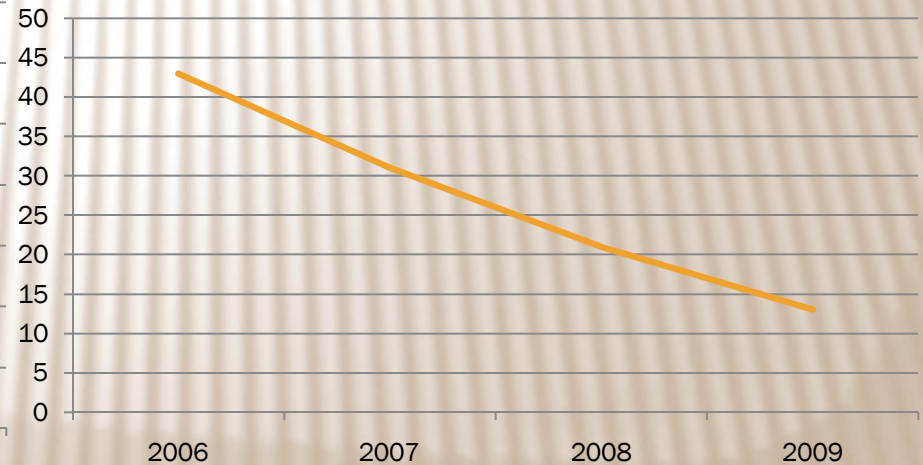
WATER TREATMENT FOR COOLING TOWERS

- ✘ Optimization of the water treatment has shown good result.
- ✘ SC has accepted the compensatory measured proposed to face a longer run (more than 12 months but less 2 years).

Number of primary water analyses per year



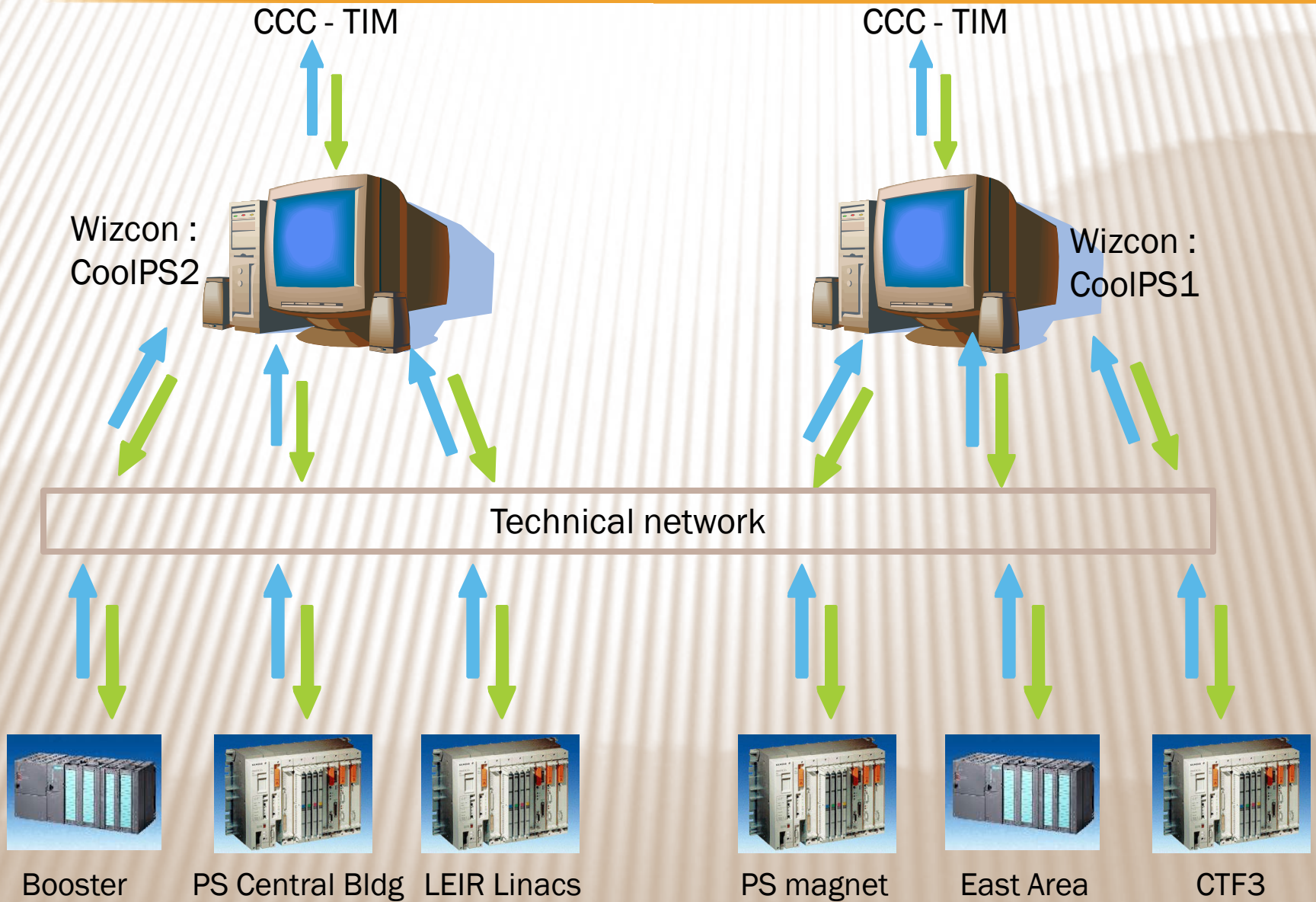
Number of result above 1000 CFU/l per year



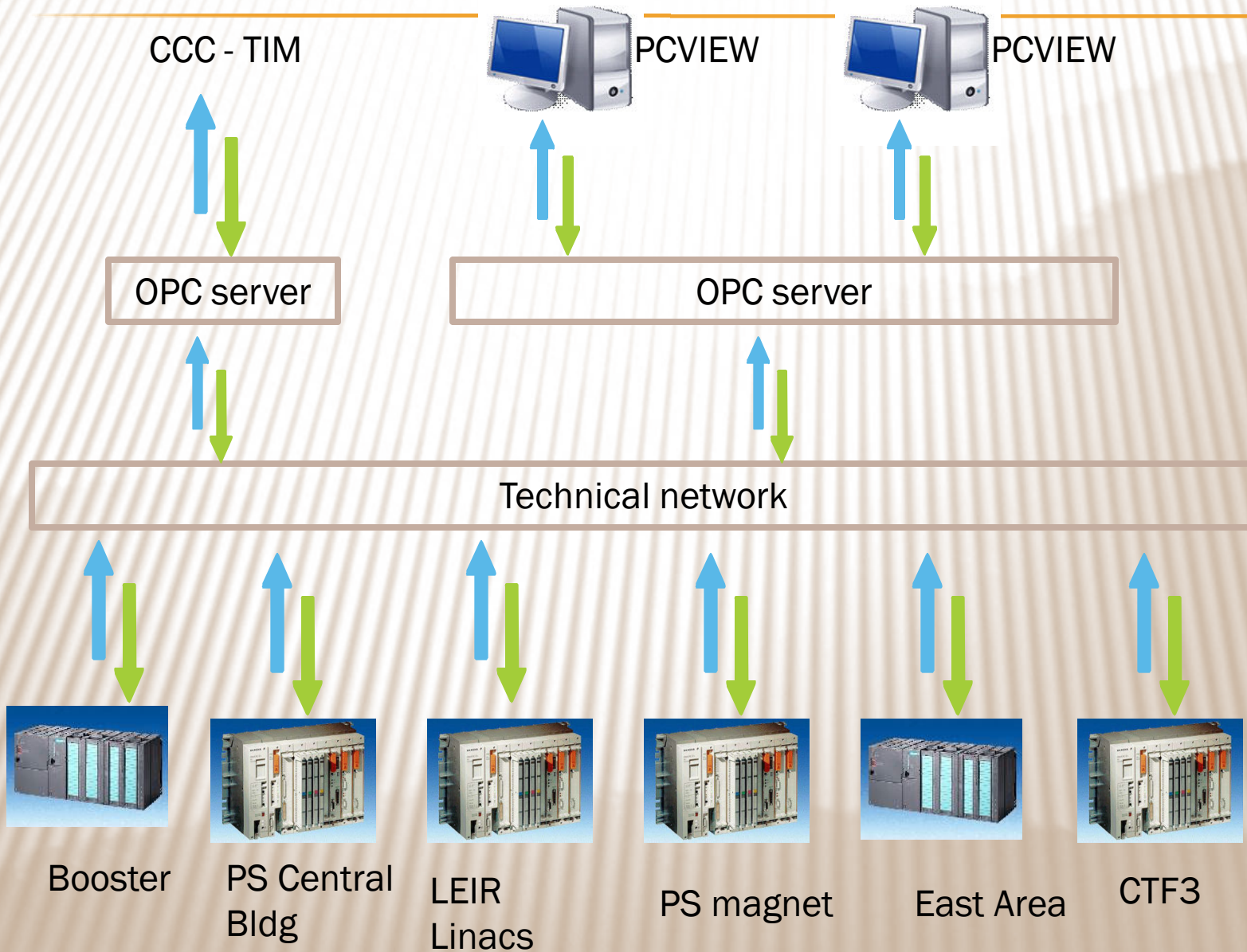
MAJOR IMPROVEMENT IN 2009 REDUNDANCY DEMINERALISED WATER PRODUCTION



CONTROL FOR THE PS COOLING STATIONS BEFORE 2009



CONTROL FOR THE PS COOLING STATIONS IN 2009

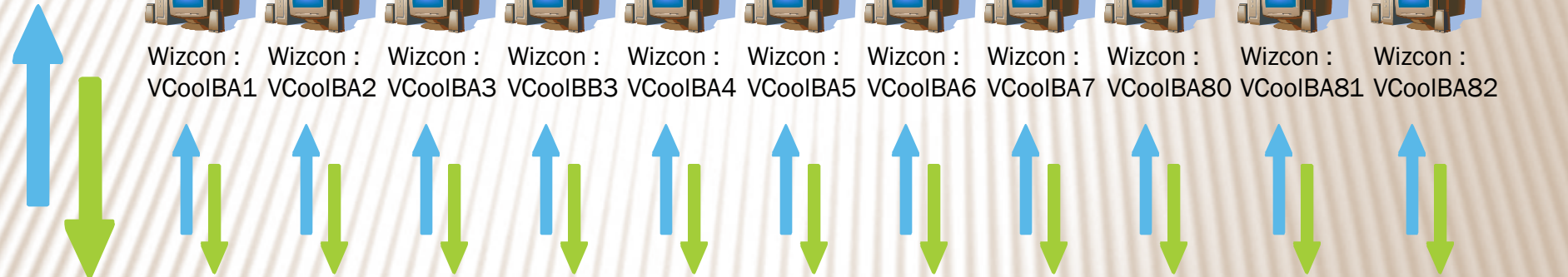


CONTROL FOR THE SPS COOLING STATIONS BEFORE 2009

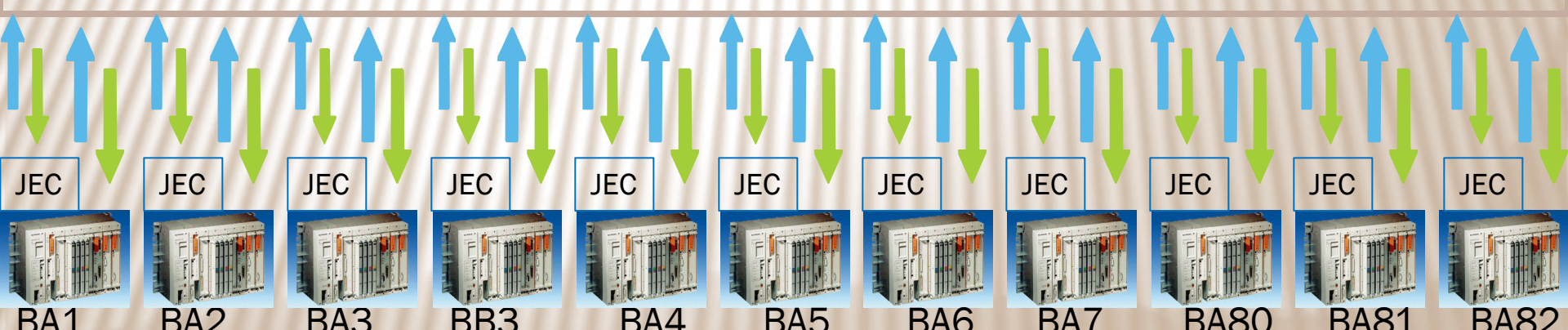
CCC - TIM



Wizcon : VCoolBA1 Wizcon : VCoolBA2 Wizcon : VCoolBA3 Wizcon : VCoolBB3 Wizcon : VCoolBA4 Wizcon : VCoolBA5 Wizcon : VCoolBA6 Wizcon : VCoolBA7 Wizcon : VCoolBA80 Wizcon : VCoolBA81 Wizcon : VCoolBA82

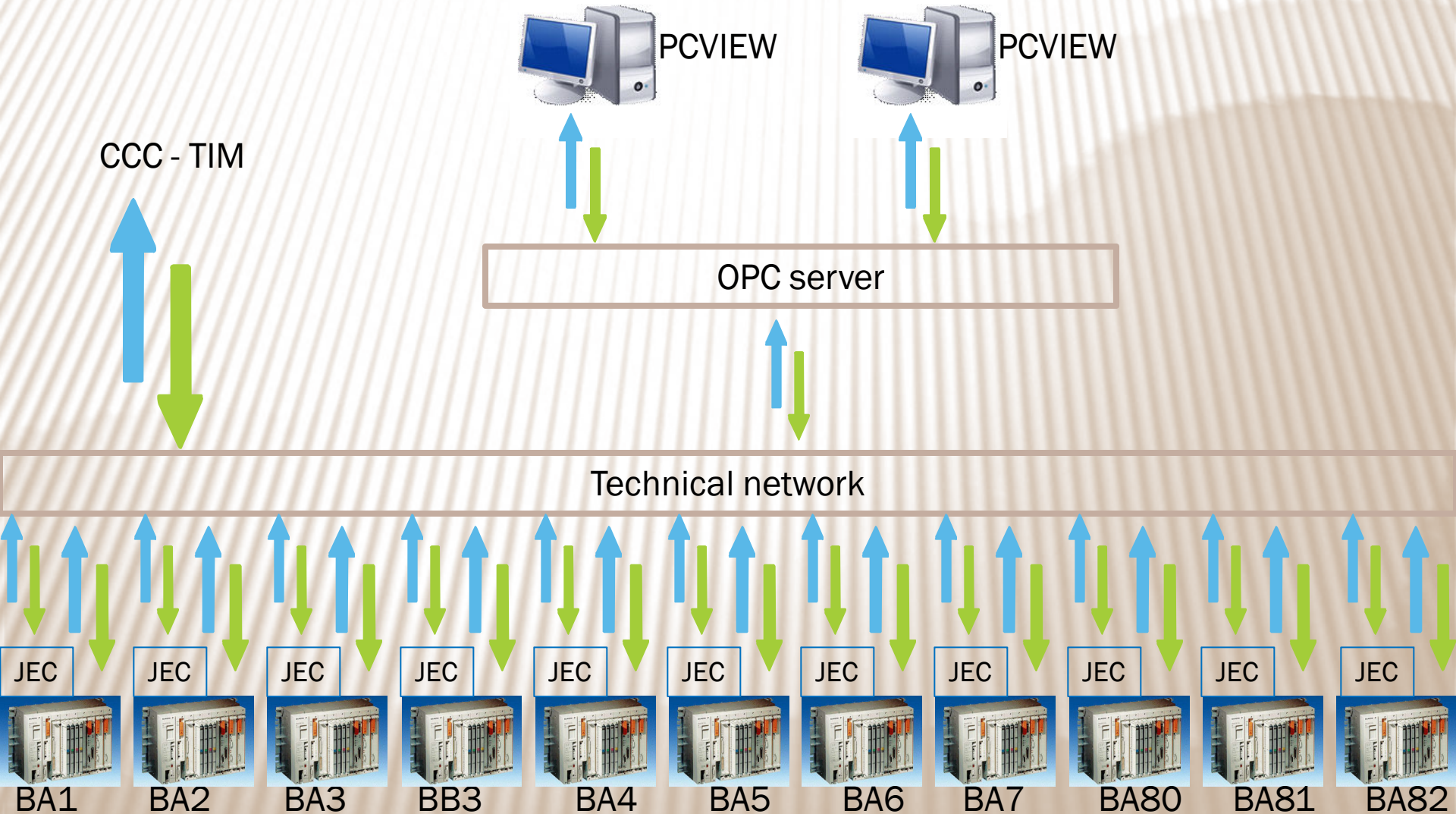


Technical network



BA1 BA2 BA3 BB3 BA4 BA5 BA6 BA7 BA80 BA81 BA82

CONTROL FOR THE SPS COOLING STATIONS IN 2009



MAJOR CONCERNS FOR THE PRESENT RUN REJECT WATER OF THE COOLING TOWERS

- In 2009 CERN receive a letter from the Swiss authorities mentioning that the reject water (coming mainly from the cooling towers) is not compliant with « ordonnance sur la protection des eaux ».

Even if the reject is respecting the limit given by SC. The difference between the concentration of Zinc in the river before and after the reject must be lower than $5\mu\text{g/l}$.

- 450 MW of cooling capacity → all the reject goes in the Nant d'Avril and CERN is providing more than 50% of the river's flow in summer.
- Several meetings with the Swiss Authorities in order to find an agreement.
- Study to change the treatment → test done in SF1 (reduction of 20% of the Zinc) will be compensate by the increase of the load (LHC)
- We'll have to treat the reject water → very important work and no budget foreseen.

Long run = compensatory measure = more treatment = the problem will getting worse.

MAJOR CONCERNS FOR THE PRESENT RUN

PS VENTILATIONS AND LINAC 3 COOLING

- PS ventilations: number of repair has increased considerably for the last three years. The technical stops become too short to be able to fix all the problems. So we're running constantly with one or two air handling units not fully operational.
→ we need technical stop (long enough and often)
→ [ref. *Mid-term consolidation plan for the cooling and ventilation facilities, 2010-2017* – August 2009]
- Chilled water circuit of the PS is not so reliable and affecting the Linac 3 cooling: Lack of pressure for Linac 3 cooling → several improvements and replacement of the pumps already foreseen this year. **Commissioning has to be done during the technical stop**
Piping → [ref. *Mid-term consolidation plan for the cooling and ventilation facilities, 2010-2017* – August 2009]

MAJOR CONCERNS FOR THE PRESENT RUN NORTH AREA CHILLED WATER AND VENTILATION

- North area ventilation :

No spare part available for the controller → modification of the control cubicle.

Important down time.

Ventilations not adapted anymore to user need → study .

- Chilled water circuit of the north area: bad state, difficult to repair (asbestos)

Piping → [ref. *Mid-term consolidation plan for the cooling and ventilation facilities, 2010-2017* – August 2009]

CONCLUSION

- Improvement in 2009: reliability increased for the production of the demineralised water, for the water treatment and for alarm transmission of the PS cooling station PS
- Improvement foreseen in 2010 for the Linac 3 cooling but it remains a strong concern for this run
- Following the agreement with the Swiss Authorities on the CERN water reject limit, We'll have to find the appropriate technical solution to treat the reject → resources will be needed
- To be able to maintain condition in the PS and to implement the replacement of the pumps for the PS chilled water we need technical stops