



# **CV activities on LHC complex during the long shutdown**

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**Thanks to**

**M. Nonis, Y. Body, G. Peon, S. Moccia, M. Obrecht**

**Chamonix 2011**



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# Maintenance status

Equipment	Maintenance done	Maintenance not done	1/1/2012: missing since
Cooling	<ul style="list-style-type: none"> <li>• Cleaning of the cooling towers</li> <li>• Mecanical maintenance of the pumps</li> </ul>	<ul style="list-style-type: none"> <li>• Safety tests</li> <li>• Instrumentation</li> <li>• Electrical maintenance</li> <li>• Test alarm transmission...</li> </ul>	3 years
Ventilation underground units	<ul style="list-style-type: none"> <li>• Filters and belts replacement</li> </ul>	<ul style="list-style-type: none"> <li>• Instrumentation</li> <li>• Mecanical maintenance</li> <li>• Electrical maintenance</li> <li>• Test alarm transmission...</li> </ul>	2 years
Ventilation on the surface, sump and compressed air	Complete maintenance	-	1 year

For the long shutdown:

→ Need for real stop of the cooling 4 weeks/point

→ Need longer acces for the ventilation in the underground: 2 weeks/point



# Projects 2011 - 2017

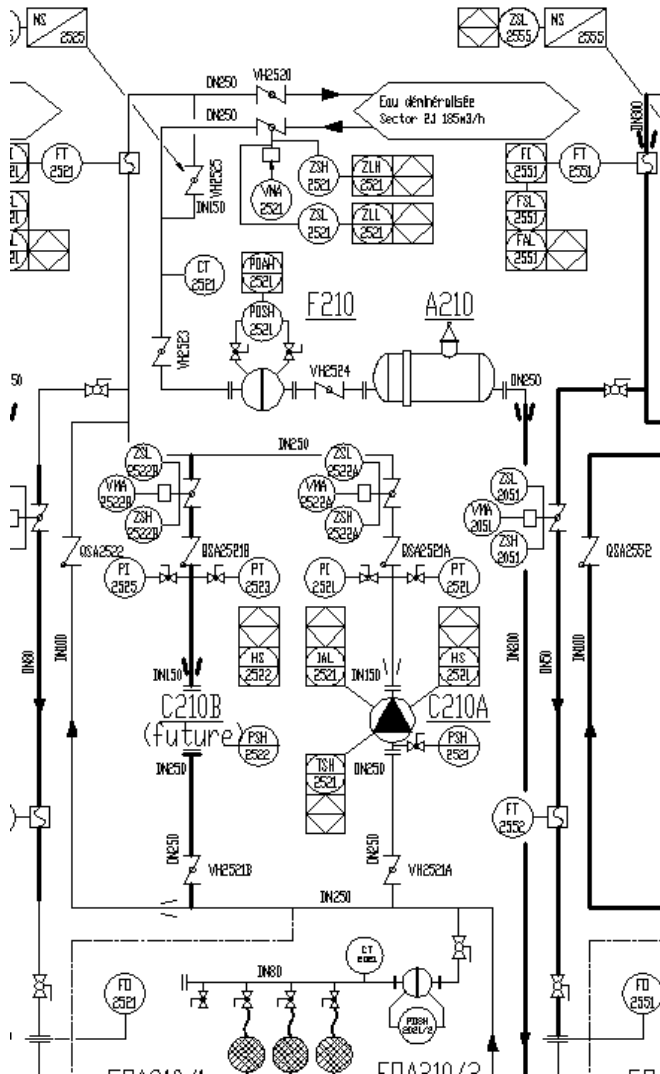
Type of project	Example	Number
Upgrade	UW, CCR, Chilled water point 2	18
New installations	Linac 4, critical power 513, CMS clean room, Isolde, bldg 107	21
Original CV consolidation plan	PM32, PS and Booster ventilation	36
Consolidation injectors 25 years	Cooling of the PS magnet and Central bldg	12
<b>Total</b>		<b>87</b>

Foreseen projects 2011-2012: 37

One project might concern several plants (i.e. cooling tower back up)



# UW upgrade : stand by pumps



## – Aim of the project:

- Increase the reliability, decrease the downtime in case of failure, and integrate the new need.

## – Project consist of :

- Installing the redundant pump for each sector + T12 and T18.
- Changing the pumps for two sectors.

## – Duration of the work:

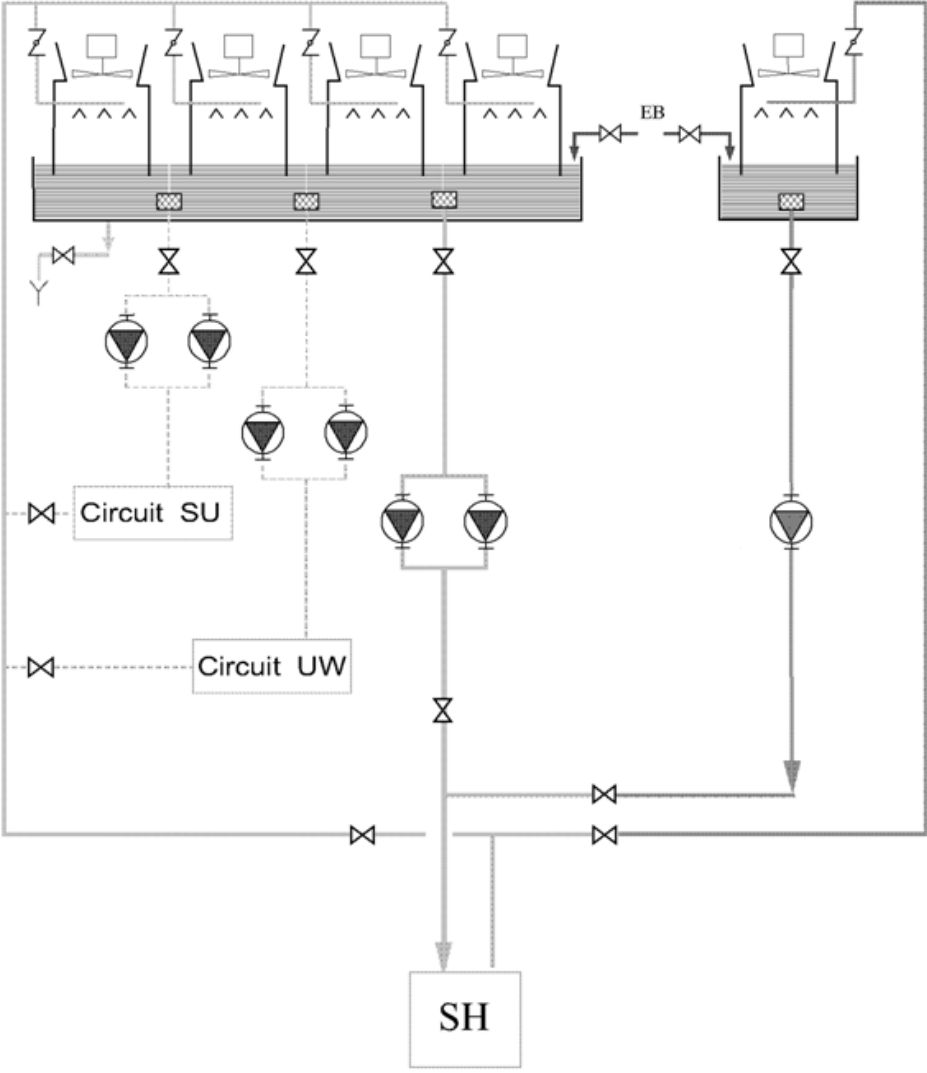
- 8 months
- Stop of the circuits for 6 weeks (sensible point in the alcoves)

## – Cost estimate :

- 850 kCHF



# Back up for the primary cooling for cryo



- **Aim of the project:**
  - Ensure the cooling during the maintenance of the cooling tower for point 4, 6 and 8.
- **Project consist of :**
  - Installing a back up cooling plant for 6MW, only for the cryo.
  - Connect it to the existing distribution circuit.
- **Duration of the work :**
  - 3 months/point
  - Stop of the cryo circuit for 2 weeks.
- **Cost estimate :**
  - 3.6 MCHF



# Back up for the primary cooling for ATLAS

## – Aim of the project:

- Ensure the cooling during the maintenance of the cooling tower for ATLAS (coordination with SPS schedule)

## – Project consist of :

- Connecting the ATLAS primary circuit to the SPS ring.
- Pipework and civil engineering

## – Duration of the work :

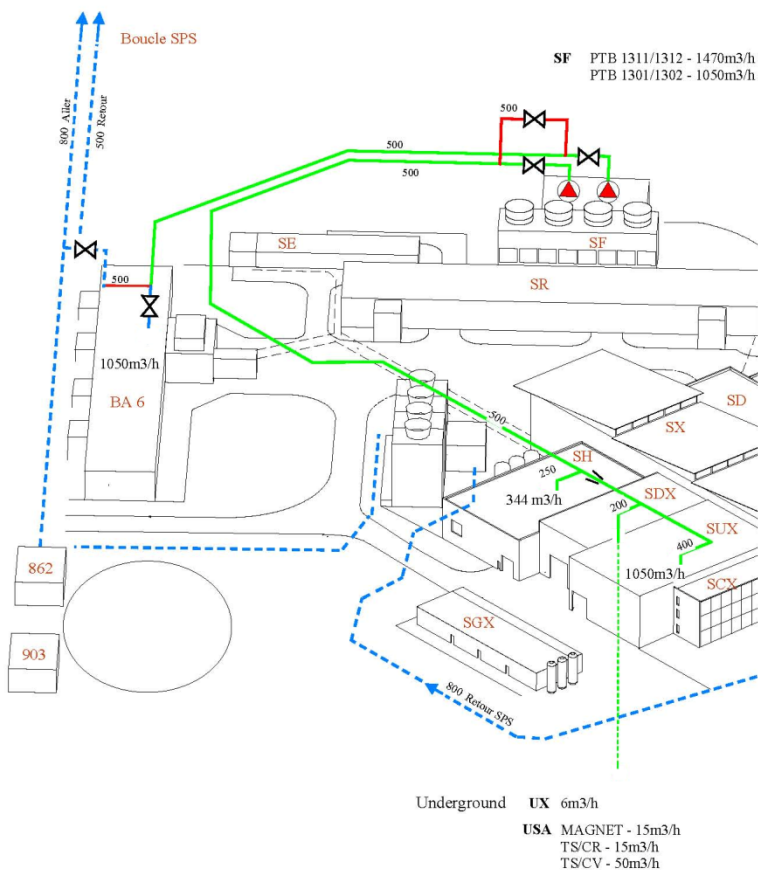
- 4 months
- Stop of the ATLAS circuit for 4 weeks

## – Cost estimate :

- 500 kCHF

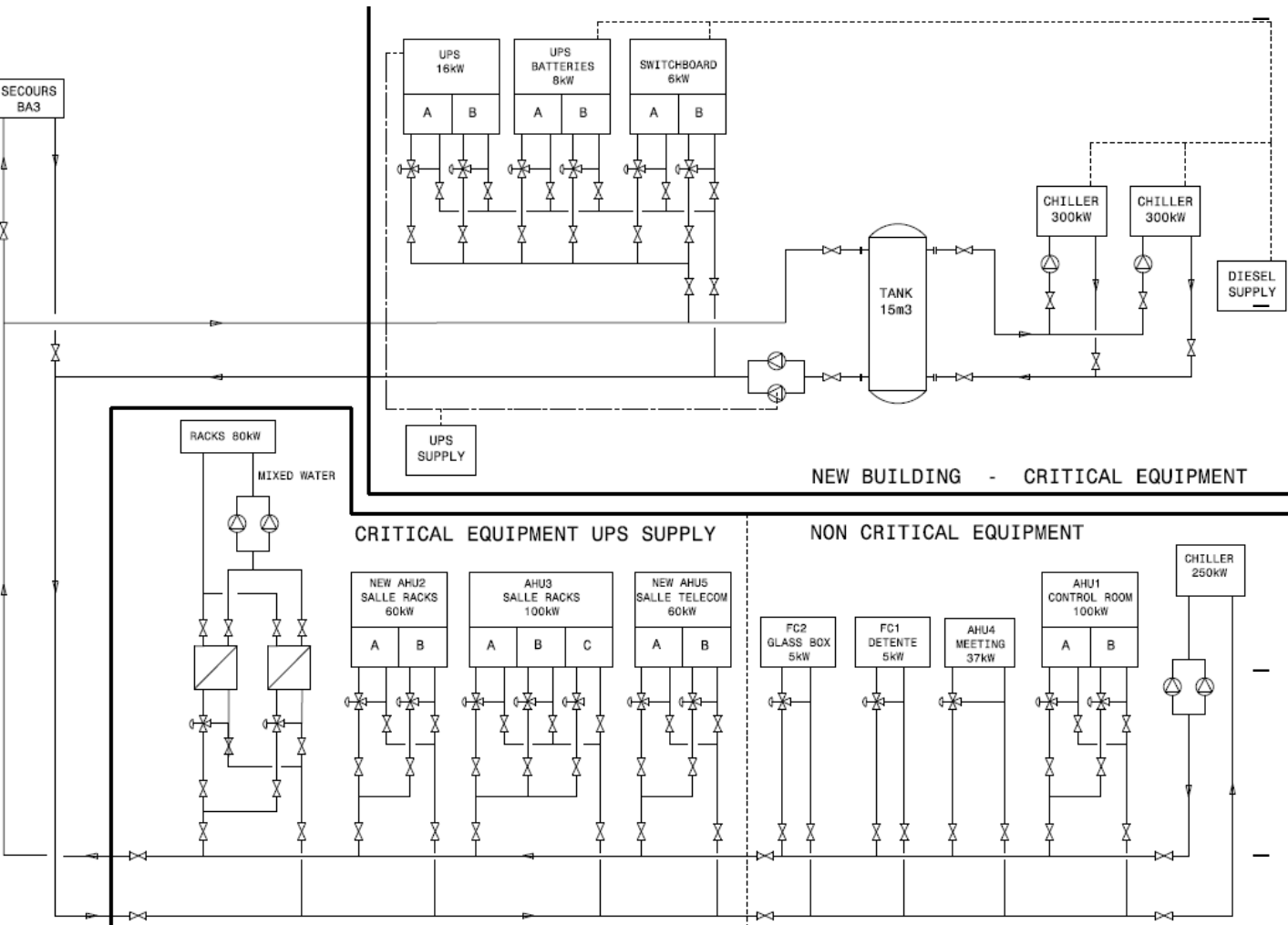
L.H.C. Point 1  
Atlas Experimental Area

PRIMARY WATER





# CCC upgrade



### Aim of the project:

- Remove the dependency from the BA3 chilled water (Test AUG)
- Increase the cooling capacity
- Get a redundant system
- Resist to the power cut

### Project consist of :

- Adding two dedicated chillers for the CCR,
- Modifying the electrical supply with new UPS and diesel generator,
- Installing new air handling units ,
- Installing a cooling system directly on the racks

### Duration of the work:

- 6 months.
- 1 month stop of cooling (incl. BA3).

### Cost estimate :

- 2 MCHF





# Other projects

- **Upgrade of the primary water in point 4**
  - Add a stand by pump and reduce the risk of affecting LHC in case of failure.
  - Reduce the energy consumption of the plant (EDF).
- **Upgrade of the chilled water production of point 2**
  - Install new chillers to get a redundant system.
- **Overpressure in Point 8 tunnel vs LHCb cavern**
  - Install a ventilated sas in the RB84 and RB86 to achieve correct dynamic confinement between tunnel and cavern
- **Monitoring of the air in the LHC tunnel**
  - Install new sensors for air speed, temperature, and delta P



# Consolidation

- **PM32 : Evacuation of the underground water**
  - Replace the electrical and control cubicles (no spare parts)
  - New type of pump and civil engineering work to integrate the new access constraint → avoid the manual operation of sand removing.
  - 3 months of work. Keeping the existing system running in degraded mode.
- **SR building ventilation refurbishment**
  - Replace the electrical and control cubicles (no spare parts)
  - Motors, ventilators, sensors and actuators change
  - 1 year of work. Condition inside the building could be affected.



# If the long shutdown : 2013

## – Maintenance and reliability:

- 4 years without any safety test and very light maintenance could lead to longer and frequent stops.
- Run for one more year with the actual weakness: UW sector, SR ventilation, no redundant chiller in point 2, no redundant primary pump in point 4, ...

## – Projects :

- Not affected
- Important project like Linac 4, 513, Hiradmat will be completed by 2013.



# Conclusion

## – Maintenance

- Will be a strategic activity to recover correct technical condition of the equipment for the successive run.
- A stop of the installations will be mandatory.

## – Project

- Very important workload
- Impact on the availability of the plant – coordination with other activities.

## - 2013 ?

- No major issue