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CM 46

October 6th 2016

Hall water

Hall Water

HEAT DUMP

Glycol-system (-25C safe)

- 2 off 347kW chillers mounted on MICE hall roof – redundant or dual.
  - independent redundant circulation pumps
- 1 off 400kW dry air blast chiller – on MICE hall roof
- Mixer valve to shift load from dry air blast to chillers dependant on ambient temps.
- 3 off 7 bar pumps, any 2 running simultaneously

HEAT EXCHANGER

PRIMARY CIRCUIT – 'inhibited' or 'town' water

- 3 off 7 bar maximum pumps – 2 simultaneously on rota
- Approximately 500l/min at 5 bar to Hall
- Supply temperature set on roof, min 15C.

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Hall Water

SS magnets – inhibited water

- 10 cryo-mech 1000 series compressors – 12kW each @ ~10l/min
- 2 cryo-mech songle stage compressors – 10kW each @ ~ 10l/min

FC

- 2 cryo-mech 1000 series compressors – 12kW each @ ~10l/min
- 1 cryo-mech 1000 series compressors for H2 – 12kW @~10l/min

Trackers

- 4 sumitomo compressors – 9kW each. @~8l/min

Total maximum 212kW, 190l/min

Warm Magnets – de-ionised water

6 quadrupoles inc PS 40kW max each @ 35l/min
1 dipole in PS 60kW? @ 35l/min
Dipole PS only ~10kW @10l/min
3 dipole PS only ~5kW each @5l/min

Total 325kW, 270l/min theory, 135kW max. 220l/min practice

Grand Total 347kW

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Warm magnets and Power supplies

- Require high purity water max conductivity of 1uS/cm – not suitable for compressors.
- Use Heat exchanger in trench with controlled bypass valve to stabilise deionised circuit
- Primary of heat exchanger supplied from primary water circuit – 300l/min at 20C nominal.
- 2 off pumps in redundant configuration to supply 5.3 bar 300l/min to secondary of heat exchanger.

- Potential to cool DS Kaeser compressor using primary water
  - reduces load on hall air conditioning
  - 'simple' installation
  - Currently not high on priority list.

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Current Status

Water circuit ‘split’ completed

- 2 ‘cooling loss’ events
- snapped pipe.
- 2nd due to burst ‘soft pipe’ resulted in warm up of downstream tracker.

Trench system – working with active control and epics GUI
300l/min primary, 220l/min secondary, <10C temperature rise across magnets, all power supplies nominally ‘happy’

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Current Status

Weekend past – motor protection circuit failed on one chiller resulting in loss of 50 % of cooling capacity – down to 347/2 = 173kW – temporary repair – full cooling capacity, no redundancy.

Full cooling capacity not delivered.

- Actively controlled mixing valve fully open and working.
- Chiller supplying glycol/water at 8C
- Primary supply 19C/24C.

Temperature difference glycol to primary circuits in heat exchanger is twice design value at approximately 10C
Possibilities

- Flow problem/air/cavitation
- Contaminated/furred/dirty heat exchanger

Engineer returns tomorrow to make further measurements.
Plan for possible intervention end ISIS cycle.

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Air-conditioning

- 5th air-conditioning unit installed in hall
- 2 units repaired.
- RR2 air conditioners failed due to ‘software issues’ – repaired and improved