

DCP WP3

First thermo-siphon workshop

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Low temperature condensation

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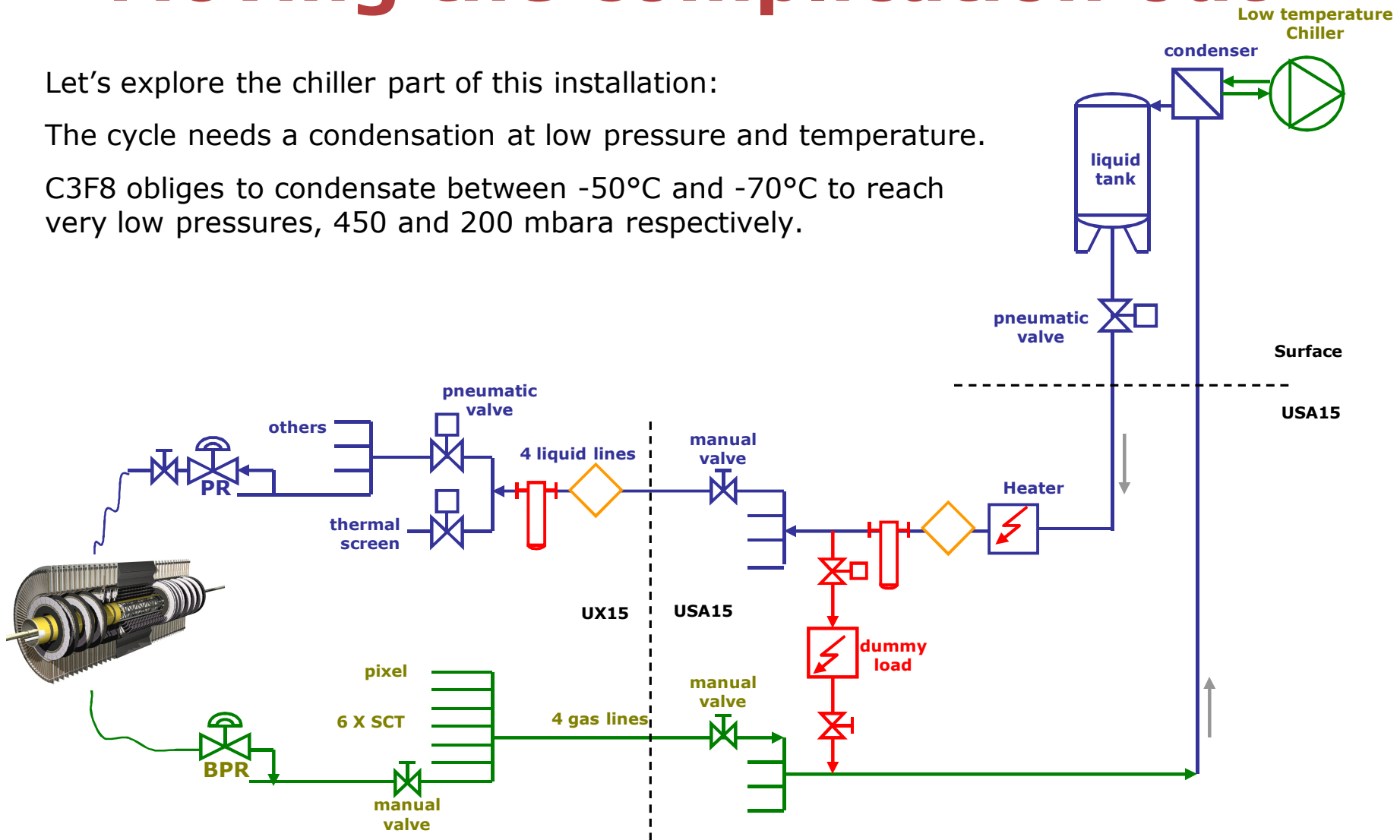
6th July 2009

Moving the complication out

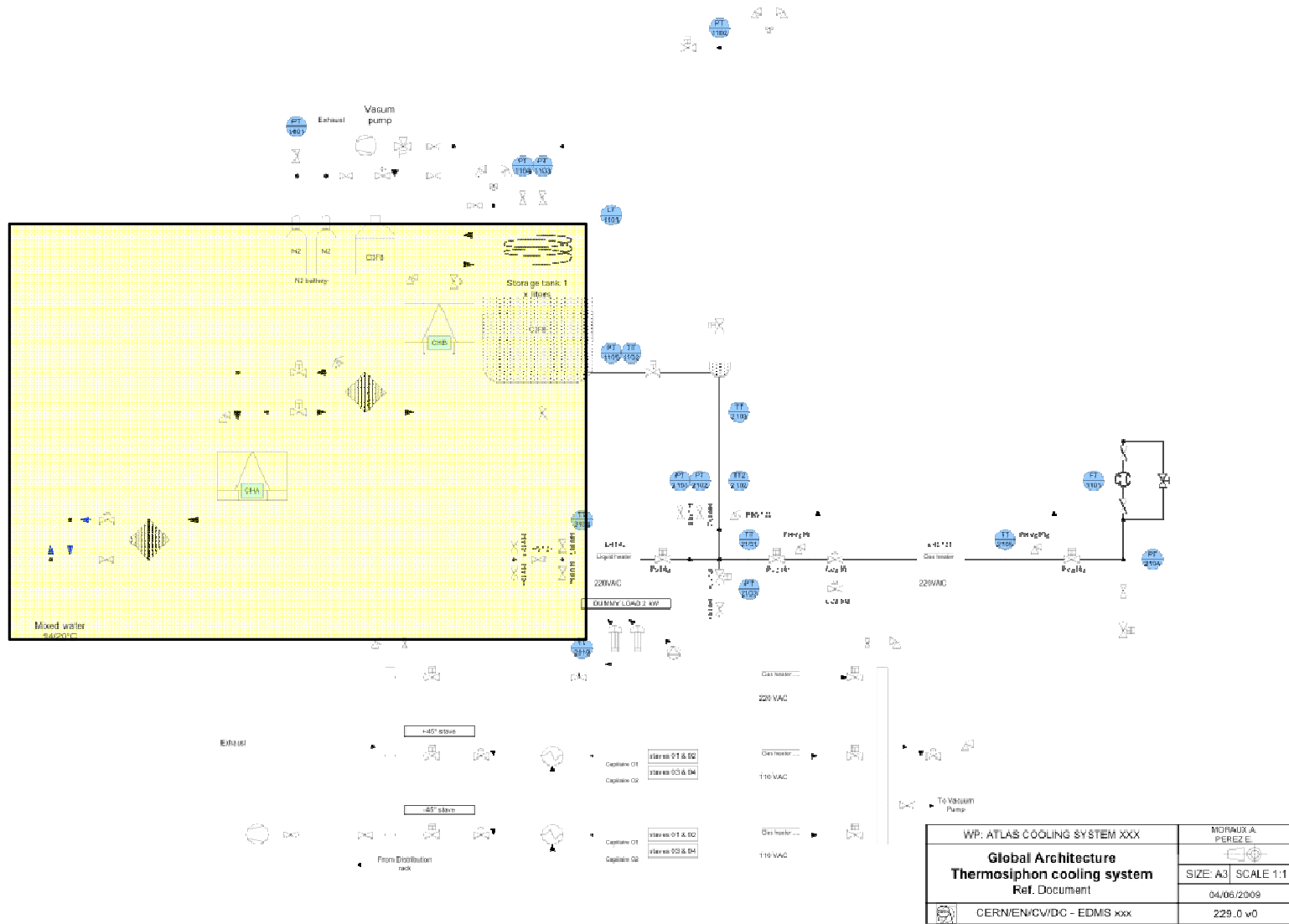
Let's explore the chiller part of this installation:

The cycle needs a condensation at low pressure and temperature.

C3F8 obliges to condensate between -50°C and -70°C to reach very low pressures, 450 and 200 mbara respectively.



The chiller is the critical part of the installation



WP: ATLAS COOLING SYSTEM XXX	MORALIX A PEREZ
Global Architecture Thermosiphon cooling system Ref. Document	SIZE: A3 SCALE 1:1
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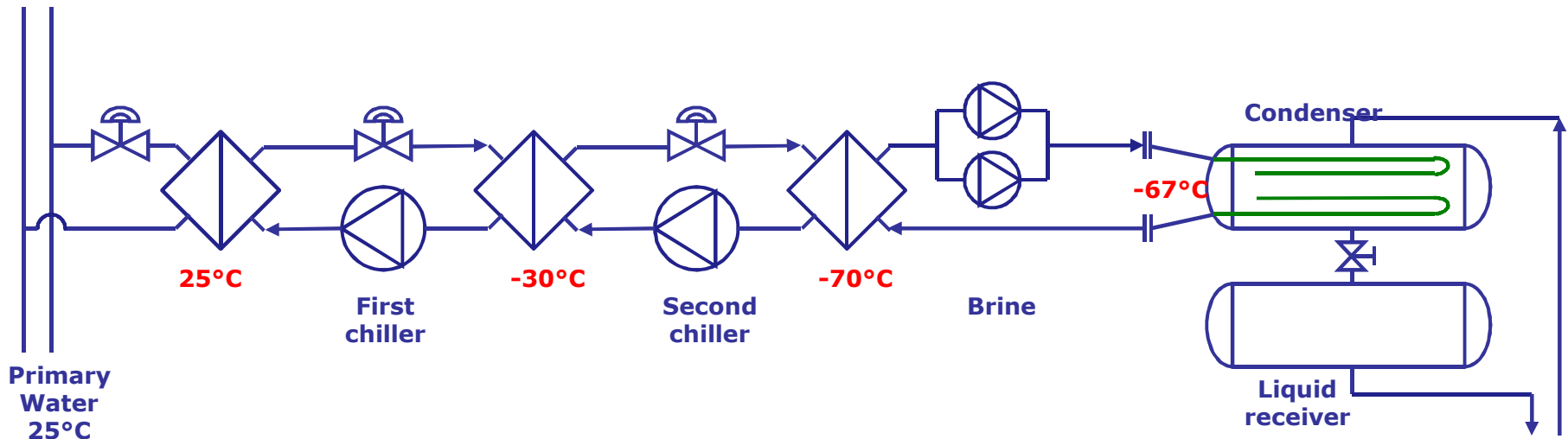
The fridge cascade

Cooling source is the primary water coming from the cooling towers: $\approx 25\text{ }^{\circ}\text{C}$

Two fridge systems in cascade takes the temperature to $-70\text{ }^{\circ}\text{C}$.

The first stage uses R11 and the second stage R507a.

The second stage cools down a small liquid brine circuit R134a used to condensate the C3F8 in the condenser of the thermo siphon circuit. The condensed C3F8 falls in the liquid receiver due to gravity.



Many possible suppliers

The fridge cascade shall be:

- 1) Fully redundant (2 x 100% or 3 x 60% solutions can be adopted)
- 2) Highly reliable (proven performances and MTBF)
- 3) Automatic (the control system will be independent to the thermo siphon one)

We will search for fully industrial hand-key solutions realized by reliable company with a proven list of similar installation realized in the past.

We are now in the Market Survey (MS) phase. The visit to the companies premises will be part of the selection criteria of the MS. The Invitation to Tender (IT) will be sent to the selected companies only.

The long list is:

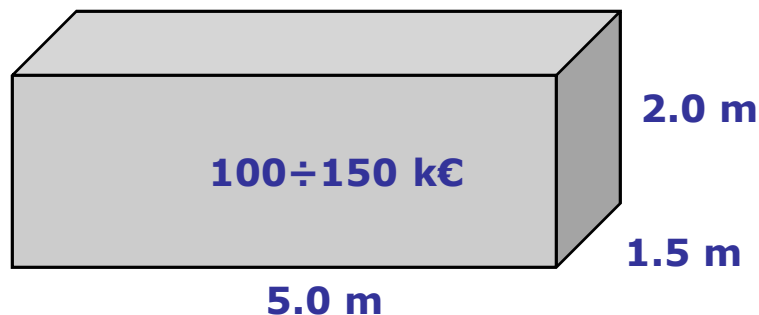
Axima Refrigeration (D), Axima (CH), Angelantoni (I), Froid Seicar (F), Mayekawa Europe (B), Clauger (F), others are going to be selected

Visit to Angelantoni on June 29th 2009

Clear previous experience on refrigeration for industry:

- 1) Brine chilling units, package design, air-cooled or water-cooled, refrigerating capacities from 30 to 800 kW, temperature range from 0°C to - 80°C.
- 2) Refrigerating systems for harmful gas or vapors condensation, to avoid environment pollution, custom-designed according to Customer requirements, capacity range from 30 to 2.000 kW, temperature range from 0°C to - 80°C.

We are waiting (this week) for the first detailed technical and commercial offer for a cooling unit 6 kW @ -60°C or -70°C. The budget offer is around 100÷150 k€



Conclusions

- The low temperature cooling source is the critical part of the thermo siphon installation. It leads the MTBF of the system.
- We believe that a fully redundant, fully industrial solution shall be adopted.
- Previous experiences (EN/CV/DC) with industrial contract show how the supplier selection is a very critical point.
- We are going to launch the Market Survey for the selection of the short list of companies for the supply and installation of this part of the system.
- The first stage will be for low power (ATLAS IBL design parameters).
- This will validate the solution for phase II.