

## **SPES - Specific Services for CMS**

### **Minutes of the meeting nr 21 held on 14/11/2001**

Presents: R.Principe, G.Lion, N.Bangert, A.Herve, P.Giacomelli, L.Isaksen, D.Campi, P.Baillon, M.Lebeau, F.Mossiere, J.Cogan, I.Crotty, A.Hormiere, O.Teller, M.Jeske, A.Zschoppe, H.Postema, P.Ingenito, A. Gaddi, A.Ball, I.Wichrowska-Polok.

#### **1.DEMINERALISED WATER AND CORROSION. (G. Lion)**

G.Lion has explained general principles of the galvanic corrosion. This type of corrosion happens, when two dissimilar metals are in contact and in presence of corrosive electrolyte. One material coupled with second, nobler material can corrode. Water as a carrier of current plays fundamental role in the rate of corrosion. (See annexe 1a). The galvanic couple of stainless steel and aluminium in presence of demineralised water will have limited corrosion. Stainless steel (Fe, Ni and Cr alloy) has passive chromium oxide film on the surface. The chromium oxides are resistant to corrosion for pH=5-12 (see annexe1b). Aluminium is always covered with oxide film  $Al_2O_3$ , which is also resistant to corrosion in pH=4-8 (see annexe1c). In conclusion G.Lion said, that the simple surface to surface contact of Al and SS, in presence of demineralised water (of conductivity around 0.1 microSimens, not polluted with Cu particles and bacteria free) would not affect the corrosion behaviour of the couple.

He has assured, that all aluminium alloys would have the same behaviour (see annexe 1,a,b,c).

#### **2. CONCEPT FOR MAINTENANCE AND SERVICE TENT FOR TRACKER. (M.Jeske)**

M.Jeske has presented the concept and purpose of the maintenance tent.

The purpose of this tent will be to keep tracker at low temperature 0 °C (to avoid degradation of the silicon wafers and to survive high radiation environment of the LHC) and to protect against humidity and heat.

The tent will be installed on the platform and connected to mobile AC unit (see annexe2, page 4). The mobile AC unit will be composed of dehumidifier, refrigerating unit, filter, fan and rotor drive (see annexe2, page6).

An example of Standard Sorption Dehumidifier has been shown (page7).

The cost of the AC unit will be about 50 000 CHF.

### **3. DESCRIPTION OF THE ECAL COOLING TESTS. (J.Cogan)**

J.Cogan has reminded the general assumptions of the ECAL cooling system. VFE Board consumption has increased to 2.5W/channel (from 2.1W/channel, 150kW VFE totally). There will be two cooling circuits: *power circuit* which will absorb 90% of the heat generated by VFE and *regulating circuit* which absorb the remaining heat at keeps the crystals at a stable temperature. The final design of the regulating circuit is ready. For the power circuit, the new concept has been proposed and will be tested. In a new concept, cooling tubes will be directly brazed on the housing in order to receive good thermal contact (pipes will be arranged in the serpentine). See annexe 3.

It is to be decided how the serpentine will be arranged and what will be the pressure drop and the flow. The flow probably needs to be 10l/s (5l/s first assumption).

The next steps will be to study heat transfer between VFE block and cooper housing, to choose the thermally conductive foam, fixation between the housing and the card, shape of the serpentine, stamped and double housing.

The tests will be done on module 0: first with full module with 400 crystals, equipped with the flake front end electronic and second, on smaller scale, of 1VFE block (group 2 front end electronic cards = 10 channels in total).

### **4. ECAL ORGANISATION AND PLANNING. (O.Teller)**

O.Teller has listed the development phases for ECAL power cooling. There will be research and development phase, tests on module 0, tests on single VFE modules, development and tests of module 0 prime and final design phase. The research and development phase has already been finished and presented on last ECAL week. For tests on module 0, tests on single VFE modules see J.Cogan presentation. The final design of the module 0' depends on tests results. The cooling planning schedule has been presented (see annexe4). Module 0 will stay in building 27 until 15 May 2002. The transport to H4 hall is foreseen to June 2002. SM1 functional tests will start in February 2003 and SM1 calibration in March 2003.

### **6. STATUS REPORT ON COOLING CIRCUITS FOR THE SURFACE TESTS. (N.Bangert)**

N.Bangert has listed the cooling circuits for the surface tests (see annexe6a,b).

There will be mixed water circuit for electronic racks (counting room), primary water circuit for power converters and vacuum pump, demineralised water circuit (with aluminium) for bus bars, MB, ECAL and demineralised water circuit (with copper) for HB-, HE-, HO-RBX, ME, Yoke and Vac tank. She has presented the example of the cooling unit, which can be used in hydraulic tests (see annexe6c).