Minutes of the 2nd Gas Coordination Panel held the 17/05/02

Present: G. Benincasa (ATLAS, Glimos) , R. Barillere, J. Godlewski (ATLAS, FGSO), J. Gulley(TIS), C. Gregory (ALICE, FGSO), F. Hahn, S. Haider, R. Lindner (LHCb, FGSO), D. Mcfarlane, S. Palestini, C. Schaefer (CMS, FGSO)

Excused: A. Placci

Agenda:

1. Definition of Flammable Gas Zones
2. Use of ELMB for flowmeter readout
3. Organisation chart of Gas Controls
4. AOB
   Mass Flow Controller Contract

Definition of Flammable Gas Zones in the four Experiments:

The main interest of this discussion is to understand how the flammable gas zones in the mixer room of the SG building and in the underground areas (around racks containing flammable gas) will be delimited. (The flammable gas/liquid storage areas will be classified as usual and were not discussed.)

The four FGSO's made a short report of the situation in their experiment. An approximate assessment for the number of gas racks (cabinets) containing flammable gas can be found below (special racks for gas analysis are not counted):

Experiments:	No. of Racks in Mixer Room (SGX)	No. of Racks in the UX
ATLAS	10	8
CMS	6	0
ALICE	6	?
LHCb	5	0

For the definition of the Zones three principle possibilities were discussed:

a) As in LEP the entire mixer room will be a flammable gas zone. -> Very costly because all equipment in the room must comply to ex-proof standards.
b) All racks containing flammable gas are closed cabinets with air ventilation and flammable gas detection. Thus the flammable gas zone can be limited to the size of the rack. -> Although this will create some extra cost for gas extraction in the racks, this is considered the most flexible and convenient solution.
c) Grouping all racks containing flammable gas in a dedicated area of the room. -> The incoming and outgoing gas pipes are grouped by sub-system, it was felt

inconvenient to destroy this organisation by grouping the flammable gas cabinets together.

The four FGSO's and the TIS representative agreed to solution (b). If so, TA1 will use closed cabinets for all Purifier racks, Mixer racks (if the mixer has at least one flammable component) and for all racks of the flammable systems like ATLAS TGC, ALICE HMPID, etc. The four gas coordinators will follow up the required action for the ventilation and inform their experiments about the flammable gas zoning, so that this proposal can be endorsed in the gas coordination panel.

Jonathan Gulley points out that the racks should have sizeable openings for proper air inlets, those should be located at the top (for heavy gases with ventilation top/down) and at the bottom (for light gases with ventilation bottom/up).

NOTE: TIS division will organise a course on flammable gas zoning and hazardous area classifications.

The use of the ELMB for the flowmeter Readout. (Ferdi)

Measurement Principle:

One flow cell consists of a PT 100 temperature sensor exposed in the gas flow, the flow cells are installed in the distribution manifolds situated in the UX distribution racks. In order to obtain a flow signal the PT100 resistor is heated up with a small "heating" current (typically 20-30 mA), at the same time the sensor finds itself cooled down by the gas flow, and the resulting temperature rise is a function of the gas flow. The slope measurement (in mV/sec) is taken at a constant reference temperature (typically ambient +20deg.) of the rising temperature curve.

LHC needs and readout for flow cells:

The four LHC experiments will need about 5000 to 6000 flow cells, to monitor the gas flows of individual chambers or groups of chambers. The electronic components of the readout must use radiation tolerant components and is based on the ELMB (Embedded Local Monitor Board) developed by ATLAS. The ELMB was adapted and tested for this application by TA1. In total the LHC gas systems require about 200 to 300 ELMB's. They run a special program (developed by C. Zinoni EP/TA1 and implemented by Henk Boterenbrood from ATLAS/NIKHEF) to compute the slope. Each single flow cell must be calibrated using a similar read-out circuit as the final one.

Difficulties for long-term support and future developments in TA1:

1. The ELMB design will be changed (1st. stage: new CPU, 2nd. Stage some other simplifications around the CPU) and the final design will presumably not be frozen before mid 2003. The calibration is affected by the full read-out chain and hence (most likely) by the CPU change. Therefore it is questionable if we can

calibrate the flow cells before the final validation of the ELMB and if we can (should) get ELMB's before that date (concerns mainly CMS).

2. The TA1 gas team has no expertise to intervene on the code inside the ELMB. Although Carl Zinoni developed the algorithm, the running version of the program has been implemented in the ELMB with the help of Henk who will be absent from NIKHEF for the next 12 months. Although NIKHEF is not committed to help us, this privately arranged solution worked fine for the first implementation. But it will be essential for us to have a structured support with someone located at CERN who has the expertise to program the ELMB.
3. Carl Zinoni who is fellow in TA1 finishes his contract in September 2002, which means that our (hardware) development capacity will be practically zero too.
4. Communication between ELMB and the PLC environment via Can bus. Renaud B. IT/CO2 is looking into this, apparently there is a working solution at the moment, but there are only very few industrial modules on the market.

Organisation chart for gas controls (Stefan).

(See separate sheet)

AOB.

We are investigating to get digital Mass Flow Controllers as store item, this should cover the re-occurring needs for test-beams and for Fix Target experiments as well as the bulk orders for the future mixer systems for the LHC. The goal is to switch for both types of applications to similar digital technology with flexible interfaces (profibus, RS232, standard analogue signals, etc.) The calibration facility would be upgraded for this new type. Possible firms will be Brooks or Bronkhorst.

Minutes taken by FH.