Response to the action items listed in the review committee's summary report

C. Lu, Princeton University

1, FYI, The RPC gas inlet protection bubbler sets the protecting threshold at 2cm W.C. It means the maximum working gas pressure for RPC should be less than 2cm W.C. but the maximum test gas pressure during RPC Q/C should be higher than this with plenty of safety margin.

2, Based on our prototype test experience the ambient humidity range can be 45% ~ 65%.

30, We should use couple of small RPC chambers, not proportional chambers to check the correctness of the gas mixture. Is IHEP working on this?

32, By rule of thumb RPC can work normally for a day or so w/o fresh gas flowing through if we shut off the gas inlet and do not force air flowing in. If we had a cheap way to continue flowing gas mixture into the RPC when the gas system is shut down due to any unexpected reason, it would be great. The buffer tank seems to be able to fulfill the requirement, but it won't be cheap. It should have 2~3 m^3 volume and fill the gas mixture at least 1 bar above the atmospheric pressure. The gas pressure needed to be monitored and regulated. This requirement will interfere with the operation of gas mixing panel because the outlet side of the mass flow meters and controllers will have higher pressure due to the higher pressure in the gas tank. Such a device could be much more expensive.

34, The gas inlets on the gas mixing panel and the gas outlets/inlets on the gas distribution/digital bubbler panels will use 6mm OD fittings, which are consistent with Chinese standard. That means the fitting on the RPC module should accept 6mm OD tubing.

35, The gas purities used in our R&D study are:

Ar: 99.998%; C4H10: 99.96%; SF6: 99.9%; R134A: 99.99%.

Make sure if IHEP and UH are using the gases with similar purity.

36, Have contacted Ed Budnick at Hughes Associates, Inc. His ball park cost estimation for the calculation is ~$5,000.

38, What do we need to provide for this safety review?

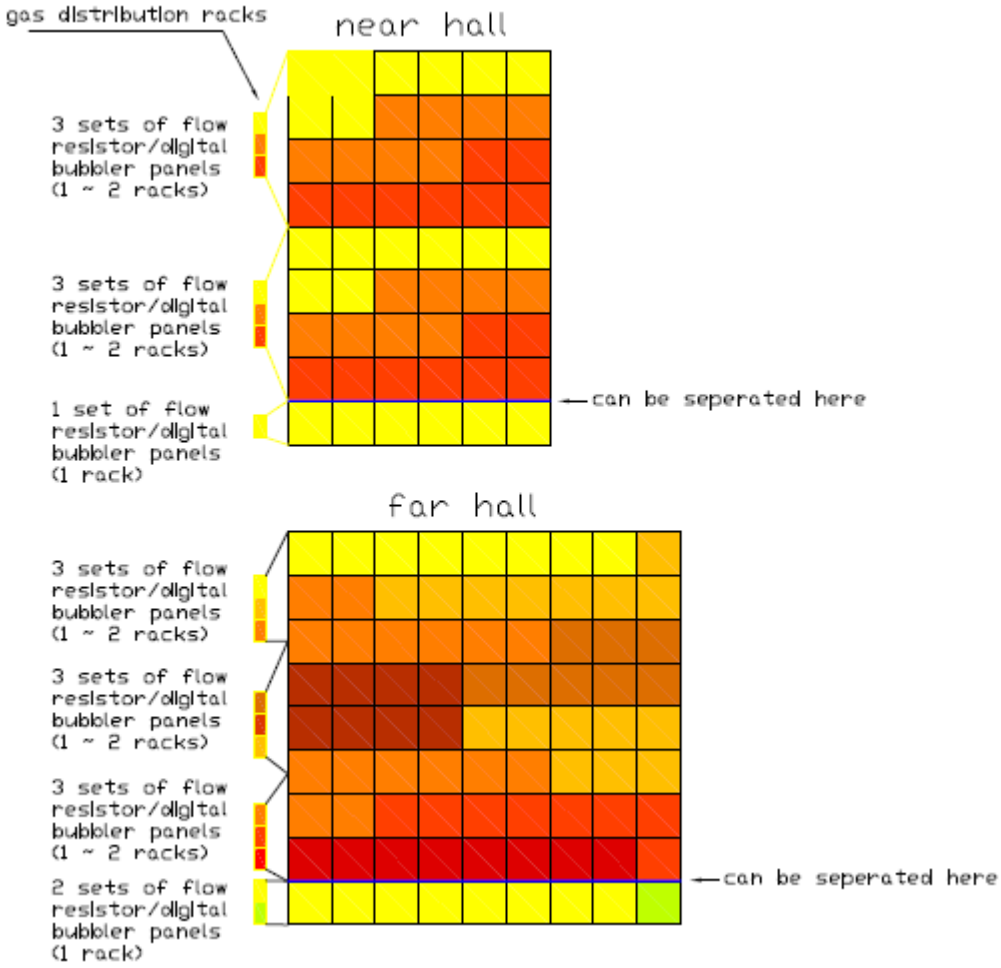
41, Anything being postponed to implement now might be never implemented later after the initial version of the gas system installed. There will be no foreseeable reason to stop running of the RPC system just for adding some additional function of the gas system after the Daya Bay experiment being started. So if we want to cut down the cost we should slash out the items that won't affect the normal function of the gas system. Cylinder changeover panels are absolutely needed. Ar cylinder automatic changeover panels cost similar to manual panel. For the other three gases it will save some money if we change back to manual changeover panels.

42, You are right. These items are still missing from the budget. If these items are in US scope, we should add them in:

- Flexible gas tubing to all RPC modules, total need 540 tubing from gas rack to the module. If average length of the tubing is 20m, around 10,000m Polyflo tubing is neede. In US we can get 6mm OD Polyflo tubing for $0.18/ft, 10,000m will cost ~$6,000. How to distribute the tubing to each module? Just let them laying down on the floor or resting on the cable tray?

- Racks for mounting gas distribution crates, for near halls total 6 ~ 10 racks, for far hall total 4 ~ 7 racks are needed. (See the following plot for the arrangement of the racks)

Arrangement of gas distribution/digital bubbler racks:



Ralph mentioned at the FDR meeting that in order to be able to access AD at any location freely, he needs to separate the last 2m wide RPC supporting structure from the rest of the structure by ~2m, then insert a 2m wide bridge with working platform attached. Since the module number in each supporting structure either 6 or 9, not a multiple of 8, the gas distribution/digital bubbler crate are 16 channels (8 RPC modules) per each, therefore we have to arrange the gas distribution racks like the way shown above. The racks will be on the supporting frame. Except the last section can be moving away with the gas racks w/o interference, the other sections are not completely independent. The gas tubing will cross from one section to the next.

- From the host PC (for digital bubbler readout) to the gas racks there will be 11 flat cables + 11 RS232 cables for far hall and 7 flat cables + 7 RS232 cables for each near hall. The host PC will be located on the Hall's floor, the gas racks will be on the RPC supporting frame. We need cable tray to route the cables. Collaboration

should oversee the cable route issue, ask each group for the cable tray numbers they needed.