**V.Chohan/16Feb05**

# Why are magnets coming back, that is, why so many Re-tests are carried out

- Thermal Cycle: Often, they have been demanded by Project Engineers &/or Manufacturers in case of poor performing magnets; this is what we( Operation) have been **led to believe up to now**, meaning the experience of 2004. { Often, performance improves after the thermal cycle to prevent an outright rejection of a magnet }

- Run 2, 3 ….x:
  - ✓ Poor training Performance in conjunction *with no anticryostats installed on the magnet* and hence exact quench locations using shafts cannot be determined
  - ✓ Poor training performance in conjunction *with Magnet Production engineers not having adequate information* to return the magnet to the manufacturers *even though Q-location with shafts had been done before* – hence need further special tests & /or equipment like q-antennae.
  - ✓ Training performance is considered OK by OP team, but there are ***OTHER*** considerations , hence magnet still considered suspect by experts

***Read ahead ONLY if truly interested in IMPROVING from the current work strategy***

To move ahead with magnet tests and in particularly production quality & adequacy of the magnets for the LHC, it is important to **organize the information** and make it available to the right people in a clear decision making format. Like it or not, the SM18 OP team has to play an important role towards this goal of dealing with the appropriate information and deciding what can be decided at the Operation level. There are often comments/suggestions that OP team is incapable of serving towards this requirement. The answer to that is rather simple : *SM 18 OP team's results & output are like for the famous software adage, " Garbage in Garbage out***". *However, feed them with the required information and it would be possible to go forward to our desired goals.***

Magnet Production Engineers Team:

- ✓ They must formulate clearly the probable magnet performance & criteria that require the magnet to be returned to the manufacturer.
- ✓ They must decide upon a list of information required for various non-conformities that is essential before the magnet is sent back to the manufacturers.

This information must be available to all concerned personnel, particularly the OP Team. This would then enable the OP team to ***append*** a set of additional tests for poor magnets as judged from the first run.

Magnet Performance Experts:

- ✓ Information on Automatic Quench Analyses (AQA) alarms/alerts, & criteria must be known & must be in the public domain
- ✓ All alarms and warning must be described in details. The possible cause / effects must also be documented.
- ✓ Signals that have to be critically checked must be known. A reasoning of the importance of these signals must be enumerated.

In 2004 we were all low in confidence on the completion of the tests programme. With the achievement of > 55 magnets per month, one may say that the mood is reasonably upbeat to meet the goals. Granted, we still do require more number of magnets tested per month, but we also require a faster "goodness" evaluation of the magnets & ***a critical judgement of that appraisal process*** *to prevent repeat magnets.* *Hence,* ***we need to " do well what we do" with all the adequate information available in SM Control Room*** and still maintaining & increasing the throughput as necessary, *without forsaking quality for quantity*. [ Implying we do not want to retest magnets except absolutely necessary]

*By carrying out additional tests of poor magnets we add further 10 to 20 hours while it is still on the bench ( assuming all relevant information is given in SMCR & equipment is already there) , but by bringing a magnet back on the bench we lose 120 to 130 hours.*
*Lastly, one must be clear that in round-the-clock work, it is not possible for committees to decide. Committees may be consulted but the **first level decision** has to be based on clarity and clear definitions.*

**NOW SOME CASE EXAMPLES FROM the year 2005 so far**

| | | |
|---|---|---|
| 2123 | 3 times Tested | Would <u>two times not have been sufficient</u> if adequate information had been there from the Project Engineers ? |
| 3278 | " | Same Comment |

**Other Magnets that Davide T. Asked me about this year in the last few weeks & want to test again ( for whatever reason, including because of MEB ) & may involve "de-stripping" & a lot of work**

| | |
|---|---|
| 3133 | Electrical Issues of questionable nature as far as OP is concerned |
| 2075 | Electrical Issues of questionable nature as far as OP is concerned |
| 3139 | Electrical Issue that OP would have clearly taken action if Clear Instructions and Clear Tools exist or had existed when this magnet was tested ( May/June 2004 ) |
| 2025 | Special Case but *STILL ON "STANDBY" rather than OK* after a 3rd run because <u>no clear definition</u> exists for acceptance or Rejection based on 4.4Kelvin Quench performance. In fact we do not even do 4.4 K quenches on all magnets. So how can one have a "goodness" criteria rule based on that ? *As far as Operation is concerned, either a 4.4 Kelvin rule MUST be provided **or**, this test is not necessary & we are still doing R&D on cable limits under the pretext of serious LHC preparation work !* |