Minutes of the 32nd Plenary Meeting of the LHC Resource Review Boards (RRB)
(CERN, Geneva, 11th April 2011)

1. Welcome. S. Bertolucci, Director for Research and Scientific Computing

S. Bertolucci welcomed delegates to the Plenary meeting of the RRB.
The minutes of the last Plenary Session CERN-RRB-2011-006 were approved.

2. CERN Status and News. S. Bertolucci, Director for Research and Scientific Computing

S. Bertolucci, reporting on behalf of R. Heuer, confirmed the decision to run until 2012. This was based on a very successful 2010 and the possibility of confirming, or excluding, the existence of the Higgs Boson before the end of 2012. Another reason was that, before end 2012, Europe will update its strategy for Particle Physics and input for this revision is very important. Within the five year plan, the change of schedule has minimal impact on the costs.

The experiments are planning for the highest possible luminosity, which may be above 10^{33} cm^{-2} s^{-1}. The baseline of 1 fb^{-1} per experiment will probably be exceeded and this will have an impact on the computing capacity which may have to be increased well in advance of the October RRB.

Five new countries have applied for Associate Membership and their requests were approved by Council in December; negotiations are in progress. Brazil, India and the Ukraine have shown strong interest in becoming Associate Members.

The Chamonix meeting had looked at the longer term future of the LHC. The CERN management was working with the experiments and machine experts to formulate the 10 year plan. The stop at the end of 2012 will be used to reach the design goal of 14 TeV. The main goal is to eliminate the problem of splices; in addition there may also be new collimators and a new injector (LINAC 4). The experiments will use the stop for maintenance and upgrades. The stop will last around 19 months beam-to-beam or around 2 years physics-to-physics.

As announced at the last RRB, the CERN budget has suffered substantial reductions leading to the rescheduling of several projects, but there were no cancellations. Next year's budget will be presented to Council in June; one request will be for permission to move 5% between personnel and material budgets.

A proposal to extend the current construction MoU for five years and to add Upgrade projects to the MoU through dedicated Addenda had been favourably received by the Funding Agencies.

Funding Agencies had requested "standardised" reporting of M&O across the experiments. Efforts are being made in this direction. One example was an apparent inconsistency of safety costs between ATLAS and CMS. However, after further investigation by the Scrutiny Group and management, this proved to be an accounting discrepancy.

The current model for online computing authorises a regular replacement of components. During a review involving the experiments and the management, the current model was found to be reasonable; the experiments replace hardware only when needed with a different policy for

individual components (switches, CPUs, networking etc.). A document has been drafted and comments are welcome.

3. LHC Status Report. M. Lamont for the LHC team.

M. Lamont gave an in depth presentation of the current status of the LHC, focussing on four main topics:

- Introduction
- Performance in 2010
- 2011 prospects
- Conclusions

He summarised 2010 as follows:

- Excellent single beam lifetime
- Ramp & squeeze essentially without loss
    - No quenches with beam above 450 GeV
    - Excellent performance of Machine Protection
- Optics close to model (and correctable)
- Excellent reproducibility
- Aperture as expected
- Better than nominal from injectors
    - Emittances, bunch intensity
- Beam-beam: can collide nominal bunch currents
    - With smaller than nominal emittances
- And surprisingly good availability…
- But need to understand UFOs - Unidentified FALLING objects

Turning to operation in the current year M. Lamont reported:

- Impressively fast re-commissioning with improvements across the board
- Operation cycle now well optimized: faster ramp & squeeze, excellent operational efficiency
- Fast ramp back in intensity
    - Up to 200 bunches with record luminosity
    - Integrated 28 pb^{-1} already (over 50% of last year's total)
    - Looking very encouraging
- Hiatus for
    - 1.38 TeV; technical stop; scrubbing
- Should be back into physics later this week

M. Lamont concluded that the:

- Injection, ramp and squeeze are fully operational
- LHC magnetic model & optics are excellent
- Beam instrumentation is in good shape.
- Beam cleaning and collimation works reliably with predicted efficiency.
- Machine protection has excellent performance
- Machine aperture looks good

- Performance with beam (losses, lifetimes, luminosity, emittance growth etc.) is very encouraging
- We have a beautiful machine on our hands
- Machine availability is excellent – thanks to the hard work of numerous teams
- There are problems:
    - UFOs - Unidentified FALLING objects
    - Electron cloud well understood, scrubbing ongoing
- 2011 – another long year ahead:
    - 75/50 ns bunch spacing – up to 930/1400 bunches
    - Nominal intensities, beta* 1.5 m in Atlas and CMS
    - Should be good for 5 to 10 x 10^{32} $cm^{-2}s^{-1}$ and 1 to 3 fb^{-1}

On reply to a question from the delegates, M. Lamont replied that the results of the scrubbing were going as predicted in both the warm and cold regions. The beam behaviour for 50ns is good and 75ns would be an easy fall-back situation.

4. Summary. S. Bertolucci. Director for Research and Scientific Computing

Everything is now in place for a very successful physics run. Constant interaction with the experiments and the machine is optimising the physics production.