

July 9, 2003

Dr. Michael Witherell,
Director,
Fermilab

Dear Mike,

In light of the recently submitted Run II Luminosity Upgrade project plan and the recommendations from the PAC, we would like to reaffirm our desire, ability, and intent to complete the DZero silicon detector and trigger upgrades. In any scenario, the case for a DZero upgrade is strong:

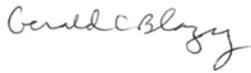
- The physics gains for the Tevatron program from upgrading DZero's silicon detector are real and demonstrable. We have carried out a first-pass physics study to quantify the expected loss in b-tagging efficiency that will accompany the degradation in the performance of the innermost layer with radiation dose. Assuming complete loss of sensitivity in the first layer, we find a 40% loss in double-tagging efficiency relative to the current detector. This should be contrasted with the factor 1.7 increase provided by the upgraded detector, which is largely due to the inclusion of two layers close to the beam pipe in the new design. Overall, this means that the silicon detector upgrade results in **almost a factor of three gain in b-tagging sensitivity**. The extended coverage in pseudorapidity and the redundancy available in the six-layer design also significantly augment our tracking capability in ways that are essential for running in the higher-rate environment.
- **The physics case remains compelling.** The recently reported Higgs Sensitivity Study has shown that improved detector performance and analysis techniques can reduce the luminosity needed for a low mass Higgs search by ~20%. There is excellent reach for supersymmetry, and an unequalled program of top quark and electroweak measurements.
- In light of the reasonable concerns raised over a long Tevatron shutdown, we have made a first attempt to re-evaluate our installation schedule. We believe we can **install a new device in a time that more or less shadows the two to three month shutdown time** that the Beams Division currently envisions needing for accelerator work in the transition to the highest luminosity running. Through the use of double shifts and the reconsideration of the logic associated with some key tasks, approximately three months access time to the Collision Hall should be sufficient for installation and hookup of the Run IIb silicon; an additional month would be needed for technical commissioning. This last step could be integrated into accelerator startup and the engineering run that would follow. The trigger and DAQ/Online systems must be integrated into the entire effort, but can be fully installed and commissioned within these time windows. A full commissioning plan, which will describe the path from a technically commissioned upgrade to the logging of physics-quality data, is now in development.
- Despite recent events the **collaboration clearly remains committed to build the device** and enthusiastically anticipates using the device for physics. It is willing to do whatever is

necessary, including investing intensively in the installation and commissioning, in order to realize that goal. We continue to discuss the upgrade with both the project teams and the collaboration at large.

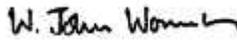
These considerations demonstrate the strong case for the upgrade of DZero. Moreover, we believe it is essential to maintain two detectors with full discovery capability at the Tevatron: to do otherwise would risk the immense investments made by the community and would shortchange the Laboratory's potential.

We plan on distributing more detailed results on the studies described above around the time of the Lehman Review later this month.

Sincerely,



Jerry Blazey
Spokespersons



John Womersley



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Upgrade Project Manager

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