11th Monthly Report of the MI BPM Upgrade
May, 2006
wbs item 1.1.3.2 of the Run 2 Luminosity Upgrade Project
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Project Definition:

The MI BPM Upgrade will replace the current BPM electronics and the data acquisition system used to transfer information between the BPMs and the Accelerator Controls Systems. As part of the project, the software used to read out, transfer, store, and analyze the BPM data will be upgraded. The goal of the project is to provide a BPM system based on modern hardware and software that gives the higher resolution and expanded functionality necessary to efficiently understand and operate the Main Injector now and for the foreseeable future including the needs for Run 2 and NUMI. Deliverables of the project include all relevant documentation, manuals, user's guides and any other written records necessary for maintaining the system.

Project Manager's Summary:

During May the project continued preparations for the installation and commissioning of the MI BPM upgrade. The accelerator was off most of the month and began to turn back on by the last week of the month as the long shutdown concluded. The prototype MI BPM upgrade system at MI40 was restarted but did not come up as expected (more on that later). Testing of the Transition Modules began in late May and problems were immediately encountered. The Controller for the Transition Module progressed nicely. Bob Dysert was appointed coordinator of the installation and commissioning of the system. Discussions with the BLM project led to a proposed plan for installation of BLM and BPM systems.

Early in the month many project members were busy at the Beams Instrumentation Workshop, held at Fermilab. Three papers were written and three posters presented about the MI BPM upgrade.

After the workshop completed attention was placed on testing the analog Transition Boards. Testing began during the week of May 22. Almost immediately problems were found on a large fraction of the modules. This was a surprise, given that a pilot run of two boards was run, tested (and failures were found), and the results fed back to the board vendor (Lace) in April. A plan was devised to test many boards quickly and to repair enough so that a full set of boards (10) could be available for the system integration test for the full MI40 installation. This was completed by the end of the month. Further stress testing was done on those boards to find any other problems before they are installed in the accelerator. This work will continue in June.

When the Main Injector turned on the MI40 prototype system, connected to 11 BPMs, did not function properly. A large effort has gone into trying to understand and fix the

problems. Though not fully understood by the end of May the problem was thought to be solved for the MI40 system by changes to the MI BPM Timing Card.

The Controller Card for the Transition Module was fabricated and tested in May, at least to the point where it has the necessary functionality for the system. The module functions well and the full quantity of boards are being fabricated.

The front-end and online software is being modified as necessary to include needed functionality, to fix bugs, etc. This work will continue as the installation of systems continues.

Resources Used in May 2006:

The total time worked on the project in May 2006 from the Computing Division was 5.5 FTE-months with 17 people contributing. The time worked from the Accelerator Division was 2.1 FTE-months with 11 people contributing. The total time worked from both Divisions was 7.6 FTE-months. The following table gives the estimated or reported effort for both divisions (in FTE-months) since July, 2005.

Month	AD Effort	CD Effort	Total Effort
July, 2005	2.1	2.4	4.5
August, 2005	1.4	2.7	4.1
September, 2005	2.8	3.7	6.5
October, 2005	3.5	4.7	8.2
November, 2005	2.1	5.1	7.2
December, 2005	1.4	5.7	7.1
January, 2006	3.1	4.1	7.2
February, 2006	4.2	5.7	9.9
March, 2006	3.0	4.2	7.2
April, 2006	2.1	4.2	6.3
May, 2006	2.1	5.5	7.6
SUM (through May, 2006)	27.8	48.0	75.8

The effort listed here is time worked and does not include vacation, sick leave, holidays, etc.

Purchase requisitions/procard obligations through May, 2006:

Small purchases were made in April, primarily for the transition control module. The final accounting of purchases for the project will be collected and reported in a future report.

Milestones:

1.1.3.2.1.2	MI BPM: Review (Milestone)	7/25/2005
1.1.3.2.4.2	All Combiner boxes available	10/25/2005
1.1.3.2.3.1.3.5	Transition module PO issued	3/03/2006
1.1.3.2.6	MI BPM system complete	9/25/2006

Meetings held, Reports Given:

Meetings were held in May on the following dates:

Project Meetings: May 9, 16, 23, 30: Minutes are available in beams-doc-1526.

Documents:

The following documents were written and added to the Accelerator Division Document Database during May, 2006.

1526-v6 MI BPM Meeting Notes and Minutes Steve Wolbers 31 May 2006

2280-v1 MI Extra Wide Aperture BPM Scaling in Difference-Over-Sum BPM System Bob Webber 26 May 2006

2273-v3 MI Extra Wide Aperture BPM Scaling in AM-PM BPM System Bob Webber 26 May 2006

2276-v1 MI BPM Commissioning Phase I Robert Dysert 23 May 2006

1822-v4 MI Service Building Survey (BPM electronics space) Marv Olson 23 May 2006

2274-v1 Analog Signal Pre-Processing For The Fermilab Main Injector BPM Upgrade Stefano M RAPISARDA *et. al.* 22 May 2006

2243-v3 MI BPM Upgrade Topics Steve Wolbers 16 May 2006

2234-v1 Analysis of Bench Test Data for the MI BPM Pickups Robert K Kutschke 09 May 2006

2252-v6 The Main Injector Beam Position Monitor Front-End Software Luciano Piccoli 08 May 2006

2250-v9 Fermilab Main Injector BPM Upgrade Steve Wolbers 03 May 2006

2251-v9 Fermilab Main Injector Beam Position Monitor Upgrade (poster) Steve Wolbers 02 May 2006