Proton Source Shutdown Work Summary

• **Major:**
  - ORBUMP/400 MeV
    • Install new ORBUMP magnets and power supply
    • Rearrange injection girder and 400 MeV line
  - Dump relocation
    • Move Booster dump, which is currently at Long 13, to the MI-8 line
    • Rework interlocks to allow to run there with MI in access
    • Use for test pulses and short batching

• **Significant:**
  - Install new water manifolding in Booster
    • Preparation for new corrector system in 2007 and 2008
  - 400 MeV line power supplies
    • Replace unreliable “Power 10” supplies with superior Lambda supplies
    • Replace a number of badly spec’ed supplies with more appropriate ones.
Shutdown Work Summary (cont’d)

• **Minor:**
  - Prep chopper area for MTA beam line
    - Move quad
    - Install some new vacuum hardware
  - Install beam stop in 750 keV line
    - Will allow ion source to run with Linac in access
  - New collimator in tank 1
    - Replace existing manual collimator with motorized one with more granularity in the aperture size.
ORBMP/Injection Modification

- New Booster Injection - ORBMP Girder & PS
  - A simplified 3 Bump injection scheme
    - Septa Magnet not required
    - Better Lattice Match
    - Alignment of Circulating beam with Injected beam
  - New ORBMP ps and magnets that can run at 15 Hz
    - Present system limited to 7.5 Hz due to heating

Provided by Jim Lackey and Fernanda Garcia
400 MeV Line Modifications

Current Scheme

New Scheme

New 400 MeV Injection Layout

Provided by Jim Lackey and Fernanda Garcia
Booster Dump Relocation

Beam is extracted from Booster when kickers at Long 2 (and sometimes Long 12) and places the beam above the septum plate at MP02. The vertical angle is cancelled by VBC1. MP02 and VBC1 are Main Injector critical devices for obvious reasons.

Two B3 dipoles at either end of the long descending line are responsible for getting beam down to the MI-8 level, which is about 11 feet below the Booster level.

An assortment of various other magnets make the necessary horizontal, vertical, and focusing adjustments.

Most of the lattice matching between Booster and the MI-8 line FODO lattice also takes place here.

Kickers Upstream Of Q804

Vertical Profile of Upstream of MI-8 Line
Additional Booster Work

• Install water manifold connections at 48 sub-periods in preparation for corrector upgrades in 2007 and 2008 shutdowns.
  ➢ Est. ~300 hours over 37 days

• Upgrade DC power supplies for 400 MeV line
  ➢ Total of 31 DC supplies replaced in 400 MeV line
  ➢ For the most part, this uses different people than all the other work.
Q74 Move

BLD – will be removed to make space for quad

Quad to be moved 10” upstream

- Move Q74 10” upstream to make room for bending $C$ magnet to be used for MuCool/diagnostic beam extraction
- Install Y pipe at downstream end of chopper
- Est. 2 days
Other Linac Projects

- 750 keV line beam stop
  - To allow ion source to run with Linac in access
  - Est. 1 day

- Tank 1 collimator upgrade
  - Motorize collimator
  - Replace collimator wand with one that has finer gradation of hole sizes.
  - Est. 2 days
Organization

- Rich Andrews
  - Shutdown Coordinator
  - Booster alignment liaison
- Fernanda Garcia
  - Coordinate 400 MeV Line/ ORBUMP work
- Bill Pellico
  - Coordinate Dump Relocation project
- Craig Drennan
  - Oversee water manifold work
- Reggie Martin
  - 400 MeV line power supply upgrade
- All mechanical work coordinated with Dave Augustine and mechanical support
## Planning Detail (example)

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<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>March</th>
<th>April</th>
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<td>Vent vacuum/disconnect electrical/LCW</td>
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<td>Connect vacuum system/pump down/leak check</td>
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**Continued (3 more pages…)**
### Overall Timetable

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~9 weeks total, driven by 400 MeV line work