| **Title** | ***Booster Bunch Cleaning*** | | | |
|---|---|---|---|---|
| Project Requestor | Michael Borland | | | |
| Date | March 21, 2008 | | | |
| Group Leader(s) | Arnold, Borland, Decker | | | |
| Machine or Sector Manager | Nicholas Sereno | | | |
| Category | Accelerator Hardware and ID Improvements | | | |
| Content ID* | APS_XXXXXX | Rev. | ICMS_Revision | ICMS Document Date |

*This row is filled in automatically on check in to ICMS. See Note [1]

## Description:

| **Start Year (FY)** | **2009** | **Duration (Yr)** | **2** |
|---|---|---|---|

**Objectives:**

The purpose of this initiative is to improve storage ring bunch purity in the +/-1 buckets.

**Benefit:**

Performance at the same level as ESRF and SPring-8 in terms of purity in the +/-1 buckets.

**Risks of Project:** See Note [2]

Low.

**Consequences of Not Doing Project:** See Note [3]

Continued substandard performance in terms of purity in the +/-1 buckets.

**Cost/Benefit Analysis:** See Note [4]

The components of this initiative are not costly and we have the expertise in this area, yet the benefits can be significant. Hence, the cost/benefit is favorable.

**Description:**

A description of this proposal in the context of an overall Booster improvement plan is available in OAG-TN-2008-008, Section 3. A bunch cleaning system exists for the PAR that is successful in removing impurity in buckets displaced by +/-3 n (where n is an integer) buckets from the target bunch. However, this system cannot remove impurity in the +/-1 buckets. This is due to the RF frequency of the $12^{th}$ harmonic system of the PAR. To do this, we propose a bunch cleaning system for the booster, which would use the same principles as the PAR system but with wide bandwidth. Bunch cleaning only uses up to 20 ms of time in the 226 ms booster cycle. This system would bring APS bunch purity to the level provided at ESRF and SPRing-8. The recent availability of high-quality tune data and the possibility of improving ramp correction will greatly facilitate the success of this system.

## Funding Details

**Cost: ($K)**
Use FY08 dollars.

| Year | AIP | Contingency |
|---|---|---|
| 1 | 75000 | |
| 2 | 75500 | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| Total | 150500 | |

Contingency may be in dollars or percent. Enter figure for total project contingency.

**Effort: (FTE)**
The effort portion need not be filled out in detail by March 28

| Year | Mechanical Engineer | Electrical Engineer | Physicist | Software Engineer | Tech | Designer | Post Doc | Total |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.1 | 0.3 | 0.1 | 0.3 | 0.3 | 0.1 | | 1.2 |
| 2 | 0.1 | 0.2 | 0.05 | 0.2 | 0.2 | | | 0.75 |
| 3 | | | | | | | | 0 |
| 4 | | | | | | | | 0 |
| 5 | | | | | | | | 0 |
| 6 | | | | | | | | 0 |
| 7 | | | | | | | | 0 |
| 8 | | | | | | | | 0 |
| 9 | | | | | | | | 0 |

[1] **Notes:**

**ICMS**. Check in first revision to ICMS as a *New Check In*. Subsequent revisions should be checked in as revisions to that document i.e. C*heck Out* the previous version and C*heck In* the new version. Be sure to complete the *Document Date* field on the check in screen.

[2] **Risk Assessment.** Advise of the potential impact to the facility or operations that may result as a consequence of performing the proposed activity. Example: If the proposed project is undertaken then other systems impacted by the work include ... (If no assessment is appropriate then enter NA.)

[3] **Consequence Assessment.** Advise of the potential consequences to the facility or to operations if the proposal is not executed. Example: If the proposed project is not undertaken then ____ may happen to the facility. (If no assessment is appropriate then enter NA.)

[4] **Cost Benefit Analysis.** Describe cost efficiencies or value of the risk mitigated by the expenditure.

Example: Failure to complete this maintenance project will result in increased total costs to the APS for emergency repairs and this investment of ___ will also result in improved reliability of ____. (If no assessment is appropriate then enter NA.)