

## FY2007 Downtime Review – Scope of work

Scope of 2007 downtime activities

### Injector

#### 1. Top Off Injection

- a. BTS Vacuum Upgrade
- b. Reroute Injector cables from trench into cable tray
  - i. Prepare - identify all cables
  - ii. Funding for cable rerouting?
- c. Booster choke magnets – seismic? (corrective action)
- d. Other?

### SPEAR

#### 1. Pre-shutdown summary:-

- a. Rigging contractor – walkdown, contract/work order
- b. Anchor drilling - contract
- c. Fabricate 5 isolation valve panels
- d. 17S – rebar survey, drill anchors
- e. LCW restrictor valve - reviews

2. Shutdown Injector and SPEAR
3. Lock off electrical system – ESO/SSRL SO
4. Vent vacuum system – zone 3 and zone 4
5. Shut down SPEAR LCW?
6. Shutdown Injector LCW
7. Remove West equipment access door

#### 8. BL13 Undulator – 17S

- e. Prep straight section 17S
  - i. Remove bellows couplings
  - ii. Remove vac chb and support frame
  - iii. Remove existing grout
  - iv. Lower cables and remove trays – wrap cables to protect on floor
  - v. *Pre-shutdown - locate anchors and survey for rebar*
  - vi. *Pre-shutdown - drill and set anchors*
- f. Installation
  - i. Roll EPU into 17S \*install under vacuum (Aug 27-29)
  - ii. Align EPU
  - iii. Replace cable trays and move cables back into trays
  - iv. Install bellows modules
  - v. Leak check (17S only)
  - vi. Hook up LCW
  - vii. Hook up TC's
  - viii. Test 17S ring isolation valves
  - ix. Connect motor and trim cables to EPU
  - x. Test EPU motors and trims
  - xi. Integrate EPU I&C with SPEAR Controls
- g. I&C Installations
  - i. Install cable tray and conduit extensions over ring
  - ii. Install rack for BL13 motor driver
  - iii. Move BL11 pneumatics junction box (Horton)

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- iv. Install rack (nr BL11 ctrl rack) for BL13 signal cables, BL 4 ID motor driver and signal cables
- v. Pull TC cables
- vi. Pull trim cables
- vii. Pull motor cables

**9. BL13 Beam Line**

- h. Front End
  - i. Beam line
  - ii. Install valve panel, cable
  - iii. Install LCW and flow switches
- i. BL13 Components
  - i. -

**10. BL4**

- j. 16S
  - i. Prep
    - 1. Disconnect LCW, cables for vac system
    - 2. Remove bellows couplings
    - 3. Unbolt AC conduit and PPS from roof blocks
    - 4. Lower cables and remove cable tray
    - 5. Remove vac support frame and chb (through aisle)
    - 6. Remove grout pads/anchors
    - 7. Locate anchors and survey for rebar
    - 8. Drill and set anchors
    - 9. Remove B131 roof flashing
    - 10. Remove roof block seismic restraint – restraints are trapped – anchors must be cut
    - 11. Remove roof blocks
  - ii. BL4 ID installation
    - 1. *Pre-shutdown – walk-down with rigging company – identify crane, methods*
    - 2. Move BL4 ID directly from 13S to 16S
    - 3. Replace roof blocks
    - 4. Align ID
    - 5. Install bellows couplings
    - 6. Roof block seismic – drill anchors and set new roof restraints in place
    - 7. Install cable tray (from 13S)
  - iii. BL4 I & C
    - 1. Install cable tray and conduit extensions from control racks to 16S over ring
    - 2. Long haul cables
      - a. Pull TC, IG cables
      - b. Pull trim cables
    - 3. Pull ID motor and controls cables (Dao)
    - 4. Test device
  - iv. BL4 Front End
    - 1. Install vac valve panel
    - 2. Install LCW and flow switches

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- v. BL4 Components
  - 1. – (Peck)
- k. 13S
  - i. Prep
    - 1. Remove bellows couplings
    - 2. Unbolt conduit from roof blocks, remove cable tray support to roof
    - 3. Dis-connect vac chb LCW, cables, etc
    - 4. Remove B131 flashing
    - 5. Remove roof block seismic restraint
    - 6. Remove roof blocks
    - 7. Pick BL4 ID and move direct to 16S
    - 8. Lower cables and remove cable tray
  - ii. Install
    - 1. Locate anchors and survey for rebar
    - 2. Drill and set anchors
    - 3. Install vac support frame and chb (Riggers)
    - 4. Install roof blocks
    - 5. Align vac chb
    - 6. Grout chb support frame
    - 7. Install seismic restraint on roof blocks
    - 8. Install bellows couplings
    - 9. Install cable tray (from 16S) and raise cables
    - 10. Connect LCW, vac I&C

**11. BL14 – 17G**

- a. Front end
  - iii. Install LCW and flow switches
  - iv. Install vac valve panel
- l. BL14 Components
  - i. -

**12. Alignment**

- m. Extend HLS system to BL12 undulator and BL12 experimental hutch
- n. SPEAR ring quad mapping and alignment

**13. System Maintenance**

- o. Computer Controls
- p. Orbit Controls
- q. Timing Controls
- r. Beam Monitoring & Diagnostics
- s. Gun and Linac
  - i. Linac pulse signal monitoring – pull cables into Linac
  - ii. Linac low level RF – modify for adjustable phase/amplitude
  - iii. Replace MPS processors – Linac & Booster
  - iv. Klystron change - TBD
- t. GTF
- u. Screens & Cameras
- v. Power Supply
- w. Machine Protection System

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- x. Personnel Protection System
  - i. 10mA Stored Current Interlock
  - ii. Magnet Interlock for Top Off
- y. RF
- z. LCW and Pneumatics
  - i. Replace all (or selected) flow restrictor valves with loops – need LCW
    - 1. Define circuits to be modified
  - ii. Bypass Boost pump from system?
    - 1. *Pre-shutdown – design spool to replace pump*
  - iii. LCW flow checks
- aa. Magnets
- bb. Insertion Devices
  - i. Insertion device checkouts
- cc. Vacuum
  - i. Retrofit QFC spacers G16 and G17
    - 1. Remove corrector magnets
    - 2. Remove TSP
    - 3. Install spacers
    - 4. Reinstall TSP
    - 5. Reinstall correctors
  - ii. Pump down sector 3, sector 3

### 14. Safety Systems

- dd. Shielding
  - i. Install lead over LINAC in diagnostics room

### 15. Controls

- ee. Power Systems
  - i. ?
- ff. I&C Systems
  - i. ?
- gg. Cable Plant
  - i. ?

### 16. Conventional Facilities

- hh. Seismic Retrofit
  - i. Building 120
- ii. Sub-station maintenance
  - i. 507? - replace breaker A5E

