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. Installl 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)

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

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 deveice 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

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