Plans for P0D Water Target Repair Summer 2012

David Warner
For
Water Bag Replacement Group
Presentation Outline

• General Description of Required Work
  – Detailed description of steps
• General Schedule Outline
  – Rough schedule for work
• Risks and mitigations
Basic Repair Plan

• Remove Top Threaded Rods
  – Disconnect utility cables required to free P0D
  – Lift the Central Target SuperPodule (CTARG) and support frame approximately 10cm using the original installation lift fixture and overhead frame
  – Remove the 3 threaded rods holding the water bag in the P0D (maximum 2 hours of work)
  – Replace the P0D into the Basket
  – Re-connect utility cables to allow P0D operation
• Move P0D utilities to access top of P0D
  – Disconnect ~70 MPPC coax cables to access water bag header
  – Disconnect water fill utility tubes required to access water bag top

• Prepare for Bag Removal
  – Assemble bag lifting frame over top of bag to be removed
  – Remove the depth sensor and fill tube from the water bag to be removed using the lift fixture
  – Lift SuperP0Dule approximately 10mm using lifting pads in P0D support frame
  – Move central CTARG support frame cross member approximately 50mm towards the center of the P0D to access the central holding screws
• Replace Bag
  – Unscrew the captive water bag fixing screws
  – Attach the water bag header of the bag to be removed to the bag lift fixture
  – Remove the water bag slot drain fitting from the bottom of the water target
  – Extract the water bag from the slot in the detector by lifting with the lift fixture
  – Inspect and clean water bag slot
  – Fish bottom guide/pulling string for replacement water bag through hole on bottom of water bag slot
– Attach guide string to bottom footer of replacement bag
– Using lift fixture, two pushing rods from the top, and guide/pulling string from bag footer, install new bag into slot in detector.
– Remove guide string from bottom of new bag
– Attach captive water bag fixing screws into bottom of new bag
– Fill new bladder with ~20cm of water & check for gross leaks
– Remove guide/pulling string from bag footer
• Conclude installation
  – Reposition central P0D bottom support
  – Re-install bottom water bag slot drain plug fitting
  – Lower P0D back ~10mm using support frame lifting screws
  – Install depth gauge and fill-drain tubes into replacement bags
  – Re-connect water fill utility tubes
• Post-Installation P0D checkout
  – Fill full P0D water target
  – Leave full for 14 days monitoring P0D for leaks
  – Re-connect MPPCs
  – Continue test until pre-Collaboration meeting closeup
On-Site Schedule

• The P0D Summer work is divided into 3 phases:
  – July 2-6: Initial inspection of P0D to confirm plan for P0D lift and Water Bag replacement
  – August 6-17: Replacement of Water Bag
  – September 17-21: Buttoning up detector and installing new drip pans and dry air covers
Phase 1: Initial Checkout: July 2-6
Bruce, Dave, Walter, Alex Clifton

- ALL WORK FOR PHASE 1 COVERED UNDER EXISTING SAFETY PLANS
- Finish removing dry air covers & drip pans. Inspect P0D for general status
- Inspect P0D utilities to determine which need disconnecting to lift CTARG
- Confirm access to P0D support frame lifting bolts
- Check impact of work on LI-- Do we need to disconnect C-ECAL LI cables?
- Confirm access to water bag lifting screws
- Confirm ability to fit lifting cables between SuperP0Dules
- Assess difficulty involved in removing shims between CTARG and neighboring S-P0Dules
• Check status of P0D installation Fixture
• Move Installation to ND-280 hall
• Clean & paint fixture
• Rehearse lift of fixture with Japanese lifting crew if possible
• Confirm ability to easily remove MPPC cables required & mark those to be removed
• Begin design of required tools for bag installation
Phase 2: Bag Replacement Aug. 6-18
Dave, Bruce, Vittorio, Scott, Alex

• August 6-8 Prepare to lift POD
  – Disconnect utilities
  – Final tool checkout
• August 9 Lift POD & remove top screws
• August 10-11 Remove & Replace water bag
• August 13 – 17 Complete installation, re-position POD, Re-connect water water target plumbing, re-connect POD utilities, finalize design of replacement drip pans & air covers
Phase 3: Final Cleanup & Closing of P0D September 17-21

- Replace water catch basin ("Drip pan") with newly designed revision
  - Includes “Smart drain” water sensor
- Replace dry air covers with re-designed, easier-use system
- Button up P0D for magnet closing
• INSERT NEW GANTT CHART HERE
Risks & Mitigation

• Cable harness from P0D may prevent lifting P0D 10cm as required
  – Mitigation: We believe we understand the utilities well, but will check during July visit

• Status of replacement water bags
  – New bags being fabricated, will be tested. At least 5 bags will be produced

• Avoiding interactions with neighboring sub-detectors
  – P0D will not be lifted out of the basket. No work will occur over any neighboring sub-detectors. There should be no impact on neighboring sub-detectors.