Water Bag Repair Update

Last week:

• Full-scale test of the water bag removal/installation fixture at Stony Brook
  -> Dave Warner and I spent Thursday and Friday at SBU

• The tests went very well!

• Basic approach works.
Test Setup

Lift Fixture

Support Rails
- Similar to rails on the real POD
- About 8” lower than the real case

SuperPODule Mockup
- Two PODules
- One water layer
- No brass
Connections to Water Bag

Movable cross-rail slides up and down inside frame

Lower rail slides horizontally for alignment

Lift points screw into threaded holes in bag header

Push rods through holes in header down to footer

Everything is clear of the MPPC housings in the lowest position
Bag Removal

Slowly lifting the bag header out
(scissor lifts used here, will add jack screws for real lift)
Bag Removal

Removing the bag
- Sliding cross rail is lifted by hand
- Pulleys for secondary support to avoid accidental drops
- (Push rods not normally in place during bag removal...)
Things We Learned

**Good News:**

- The bag footer slides easily in and out of the slot with no friction. There was no need to use force to pull it out or push it down.
  -> We may not need to install the push rods to push the footer down.

- It was fairly easy to engage the holes in the water bag footer with the screws than come up through the bottom of the frame.

**Issues:**

- The bag header is snug in the slot. We used scissor lifts to ease it out in a safe and controlled way.
  -> Add jack screws to the fixture for this part of the lift.

- The bag header may interfere with the top edge of the downstream PODule - the top surface juts out a bit
  -> Trim this edge flush with a bullnose tool before starting
Various Improvements

The test suggested a variety of tweaks to improve the fixture:

- Add jack screws for lifting the header out of the slot
- Trim edge of downstream SuperPODule with to avoid interference with bag header during removal
- Add diagonal bracing to the top rail of the fixture to improve stability
- Make vertical elements as long as possible to be sure the fixture can lift the bag completely free of the slot
- Add a second plank support at a higher level so that the sliding crossbar can easily be reached when the bag is completely out
- Offset bag mounts from the sliding crossbar so that push rods can be inserted with the bag mounted to the fixture
- Use countersunk flathead screws for the horizontal screws through the block mounted to the bag header (to stay clear of MPPC housings)
- Countersink holes in bag footer to be sure we can engage the threaded holes
Status of Other Items

Tool to cut threaded rods:  **Built**
  -> Basically an off-the-shelf bolt cutter modified to mount onto the water bag header, so the rods can be cut in a safe and controlled way

Tool to cut away water bag header material:  **In development**
  -> Needed to use the bolt cutter
  -> Much of the material can be drilled out first
    (using a drill guide)

Method statement:  **In progress**

Meeting with review committee:
  -> Trying to schedule the meeting for later this week