Towards ProtoDUNE-II

We should start a formal plan in view of the dismounting of NP04 and the assembly of NP04-II.

Some points to start discussion are listed here (thanks to Vic). **The good news is we have pretty detailed steps and daily records of what we did.**

**Vic is coming to visit Ash River I think it would be useful to work on updating this document there as well.**

General/Dismantling

* **What needs to be tested at Ash River?** 
  + **I am assuming that we do tests on all the new HV assembly**
  + **We could practice the removal of the existing system. We still have all the original**
  + **Do we want to include the first pass at the QA/QC/Inventory Management in these tests?**
  + **Up to now we have not done any of the electrical side of the mechanical tests. Do we want to include some of these in the ProtoDUNE 2 Trial Assembly?**
* There is a lot of specialty tooling/fixtures needed.  where are these now and can we make a list and start collecting them in one place
  + **Most of the tooling is at CERN, Tom and I looked in our box. We will compile a list over the next few weeks. Numerous beam and APA trolleys we shipped back to Ash River for Trial Assembly work. We will have to ship these back. Including all of our tools and the ones Argonne sent which we shipped to Ash River.**
* What is the order of removal?  Are we simply reversing the order of installation?
  + **Basically the reverse order but LOT’s of little steps not listed here. Tom is working on updating the sequence in a few weeks. Put in the scaffold and floor. Un-deploy downstream FC, move downstream End Wall, add floor as you go, un-deploy mid and upstream FC, move APA’s downstream, remove upstream End Wall. Build TPC interior cleanroom**
  + **Cut open TPC**
  + **Etc.**
* How do we unlatch the FCs?
  + **Should be pretty straight forward using our long pole**
* What are we saving and what gets replaced?  Are we keeping CPAs and only modifying them?  I assume everything is removed from the cryostat.  Do we have to fold fc’s or remove bottom FC inside the cryostat. **I think we could remove Bottom FC if we wanted.**
* There was a problem with the EW mounting to the DSS (can’t remember exactly the issue).  Does this cause a problem with disassembly.
  + **They were build backwards so how they fit togeather in the middle did not work properly.**
* Bridge beams used for EW install can be removed (assuming we are not using them for bottom FC lowering)
  + **This should be tested at AR.**
* What safety documentation/analysis is needed and when?
  + **Completely new HV system means totally new engineering analysis, new HA, new procedures. For both removal and installation. We should try and get these things approved before and not be in massive rush.**

CPA

* Plan on removing completely and dis-assembling so that they can be worked on horizontally
  + **Storage is going to be an issues as we made them one at a time and installed them. There is not enough room in the cleanroom for 3 sets of CPA’s at once.**
* Re-use existing CPAs
* Modify for curved profiles.  Replace corner FSS with rounded ones that match curved profiles

FC

* FC design has to be modified to fit pD dimensions (need new pD model and dwgs).  Hinge point on I-beam needs modification
* A new scheme and fixtures need to be developed for how to keep top/bottom FCs folded as they go through TCO
* Bottom FCs on both sides of CPA will be lowered at the same time
  + **This is not possible unless we come up with an entirely new installation plan since before we completed on drift volume first, then welded up the TCO.**

EW

* FD design needs to be modified to fit pD dimensions (need new pD model and dwgs)
* are we going with 1.5m or 2m modules?
* Need to design to accommodate beam plug.  BP roughly at interface between 2m modules
* Install using temporary beams and winches like FD.  This means that downstream or upstream EW pairs have to have load transfer to DSS at the same time.  Is this a problem for the upstream EW because of access?  How do we get upstream EW modules in place if APA/CPA/APA are fixed in place?
  + **This issue of access needs to be though about.**
* at the end of the downstream APA DSS beams there appears to be a lot of cables being routed through a feedthrough – are these cables in the way of the temporary beam?

GP

* There’s roughly 60mm less space at the top of the pD detector than in the FD.  Top GP design should be able to accommodate this
* there is plenty of room for lower GP.  Are we laying panels on the floor?  are there pipes?  Does a spacer/standoff need to be designed?