Questions from Reviewer for External Beam line

From: Independent Design Review Oct 6&7 -2015

From: Review committee

To Dean:

**Question 1)** Reusing Accumulator magnets and the assumption of them as working spares without need for refurbishment. It was stated that some budget exists, about how many are allowed for in refurbishment $?

**Answer 1):** I copied the following below from Mu2e-doc-4483 document “BOE M4 External Beamline Supporting Document” At the time of the cost estimate of the BOE there were 69 repurposed magnets and now there are 62. It is 196 hours of labor and $9.7k M$S to repair NOT refurbished 10% of the repurposed magnets.

**Repair Repurposed Magnets**

The M4 beamline will require 69 repurposed magnets that will come from the Accumulator, AP2 line, MSB or the Recycler. It is possible that during removal and transportation of these magnets suffer minor damage that requires to be repaired. Labor and M&S set aside to repair ~ 10% of re-purposed magnets.

**196 hours FNAD Mechanical Tech (make minor repairs to damaged repurposed magnets)**

**M&S**

**$9.7k repair or replacement parts for damaged repurposed magnets**

**Question 2)** How much new pipe is needed for the final focus region (to account for the angle scans – 5x per year)?

**Answer 2):** All the final focus will have new beam pipe~ 100 ft of 6” round laser welded , 316L SS. This will certainly be true from the device V936 to Q941. After Q941 we may have to go to new 8” pipe between magnets to accommodate the angle scans. We had allowed in the cost estimate for beam tube that was large special transitional for areas around the maximum bump. It was unknown at the time. Now that the lattice design is more stable and we have better knowledge of the angle bumps, the design of the beam pipe will need to be completed.

Again this come from Mu2e-doc-4483 document “M4 Vacuum System Cost Estimate”

**Question 3)**How many specialized bellows are needed at the transitions between the star chambers, the rectangular chambers, what pipe between the magnets?

**Answer 3):** The number of specialized bellows to transition between movable devices is 6 as listed below. Some of these bellows may have to be 14” in diam.

Upstream VT940 will have HCDA to VCDA transition

Downstream VT490 will just need to meet with transitional beam pipe.

Upst VT942 with need LQ star chamber to VCDA transition

Dnst VT942 with need VCDA to LQ star chamber transition

Upst V943 with need LQ star chamber to VCDA transition

Dnst V943 with need VCDA to HCDA transition

(HCDA and VCDA are rectangular 3.25”X12” but oriented 90degrees different)