ENCLOSURE DESIGN MEETING 25 MAY 2011

ATTENDEES

From CMT design A&E firm : Asad Bajwa, Chris Dagiantis, Ahmad Idriss
From FESS : Chuck Federowicz, Russ Alber, Gary van Zandbergen, Lee Hammond, Jim Neihoff
From MicroBooNE : Dixon Bogert, Jim Kilmer, Cat James

MEETING OVERVIEW

CMT previously sent to Chuck a list of questions generated while creating their first draft drawings. The meeting was spent going through each page of the draft drawings, with discussion of whichever of CMT's questions were associated with the drawing being examined.

Location of the enclosure centerline : the MicroBooNE people present explained the uncertainties in the precise definition of the Booster Neutrino Beam centerline. The FNAL Alignment group performed a survey of the BNB target hall last week at the request of MiniBooNE to resolve some of these uncertainties; the data is being checked and is not yet available. MicroBooNE has sufficient leeway in the height of the vessel support blocks to allow the floor elevation of the enclosure to change by as much as a foot and maintain the ability to place the vessel on the BNB center, vertically. Horizontally, there is less leeway for adjusting the vessel location within the finished enclosure, and MicroBooNE would like to determine the plan-view centerline to better than 1-foot and hopefully to within an inch – the data currently in-hand does not allow this.

CMT stated that ongoing examination of the water drainage around the enclosure may require raising the elevation of the "ground level" of the enclosure another 1-foot – this is in addition to a similar elevation change CMT communicated 2 weeks ago. The raised "ground level" of the enclosure is to prevent water entering the loading dock in times of heavy snowmelt or rainfall.

Overall enclosure layout : Gary showed CMT his modification which moves the Computer Room from the side of the loading dock wall to the opposite side of the cylinder from the loading dock. (the MicroBooNE collaboration was shown this modification at the May collaboration meeting). Associated with this modification is the relocation of the main transformer pad, placing this on the north side which also puts it closer to the existing utility corridor. There was discussion on the precise location/depth of the communications duct, utility corridor, and ICW piping; Jim Neihoff has all these details and will provide them to CMT. Everyone agreed to move forward with the Computer Room opposite the loading dock. Visitors to the enclosure will generally park at the existing MiniBooNE enclosure parking area, and enter the MicroBooNE enclosure through the Computer Room.

The stairwells are requested to be built from glazed masonry brick, as used in other FNAL construction. The CMT engineer stated that a mechanical review was needed, to examine the force applied to the stairwell walls resulting from the over-pressured air for keeping out argon. Jim will review whether ½" water pressure is sufficient, or whether up to 1" is needed; the CMT engineer noted that the stairwell walls have a lot of surface area, and the applied forces may require walls of poured concrete instead of masonry (poured concrete would increase cost).

Life Safety considerations : prior to the meeting, FESS requested an independent review of the life safety systems (performed by a separate contractor). This independent review is in-progress, but Jim Neihoff reported two items which have already been determined. First, two separate stairwells are required, in place of one stairwell plus an egress passage, to prevent the lower levels from being rated a

confined space. Second, the enclosure will have interlocked controlled access once the vessel is filled with cryogen, regardless of what the final ODH rating of the enclosure is, simply due to the below-grade structure and the presence of cryogens.

The added stairwell would be an enclosed volume inside the cylinder, just like the original one, but only up to "basement level" about 1-story below-grade. At that point it will become a structure on the outside of the cylinder, with a "head house" over the stair exit at ground level. Routing this stair outside the enclosure 1-story below-grade allows the preservation of the ground-level deck, which provides egress inside the enclosure between the loading dock and the computer room, and where equipment is expected to be located.

Support Equipment Locations : CMT had sketched in their proposed physical locations of the portions of the HVAC and electrical systems which reside on the outside of the enclosure, and inquired as to likely locations inside the enclosure. Lee expected to be able to use some of the space on the ground-level deck for ventilation equipment; CMT thought to locate some electrical panel boards there; Jim expected to place some cryogenics equipment there as well. So – just as with the platform over the vessel – this real-estate is being earmarked multiple times by different groups. CMT asked if the quiet-power transformers and panel-boards could be located in the Computer Room, and whether they would be designing electrical service to the platform; MicroBooNE needs to examine the placement of its equipment in order to answer this question. Jim asked that the sump pit be moved to a mid-point between the two stairwells, to allow more space for cryogenic equipment on the floor; CMT accepted this.

Building environment : CMT had no specification for the maximum allowed temperature in the main part of the enclosure. The most heat-sensitive equipment is expected to be electronics boards in the air-cooled racks, so this question devolves to what ambient air temperature is needed to keep air-cooled racks at their desired temperature. CMT will also need the total maximum expected heat load in the enclosure, so as to properly size the HVAC system for maintaining the desired ambient air temperature.

ACTION ITEMS FOR MICROBOONE

- Obtain from the MicroBooNE / MiniBooNE collaborations a definition for, and direction vectors of, the BNB centerline.
- Review the amount of pressure needed in the stairwells to prevent entry of gaseous argon.
- Communicate to the collaboration the finding that during the operations phase entry to the enclosure will entail controlled access procedures, regardless of the final ODH rating in the enclosure.
- Provide a more detailed layout of MicroBooNE detector equipment (readout, cryogenics, other) so that CMT knows where the "stay clear" areas are, and from that where the enclosure support equipment can be placed. This will include the distribution of readout and cryogenic equipment on the platform above the vessel, so that CMT can begin to design an appropriate support structure for this platform.
- Provide the maximum heat load generated by MicroBooNE detector equipment.