

### ❖ Advantages of the Meson Lab

- o Available cryogenics
- o Available space, including a long beam line
- o Available power

### ❖ A preliminary plan

- o The goal is to be inclusive - a national facility meeting all requirements for  $\beta=1$ ,  $\beta<1$ , and CW modules, and cavity testing
  - Build in four phases.
  - I present here the preliminary plans for Phases 1, 2a and 2b

### ❖ Disadvantages

- o We have to clean up the Meson East area





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M-East



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M-Polarized



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Jefferson Lab

P. Limon

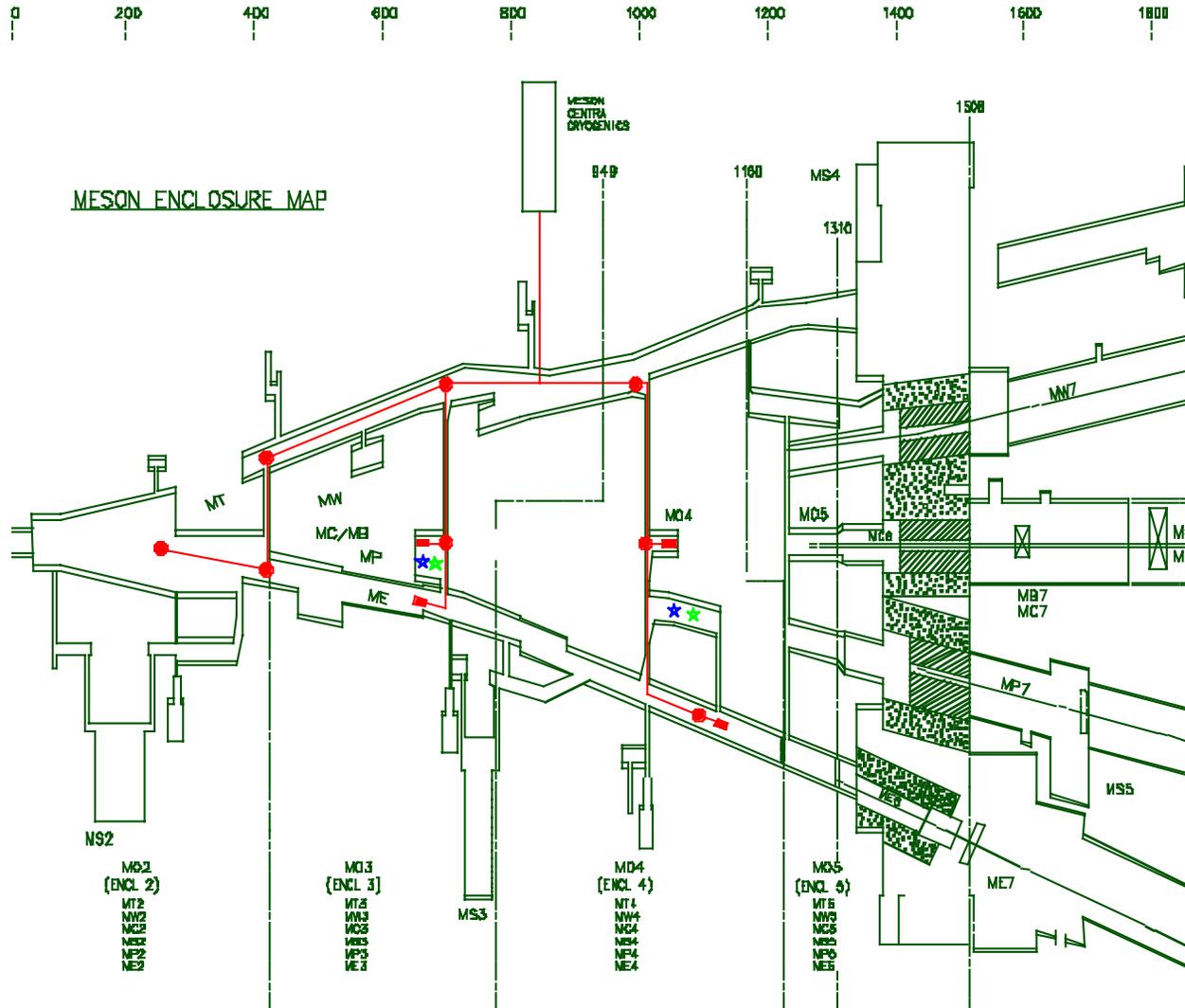
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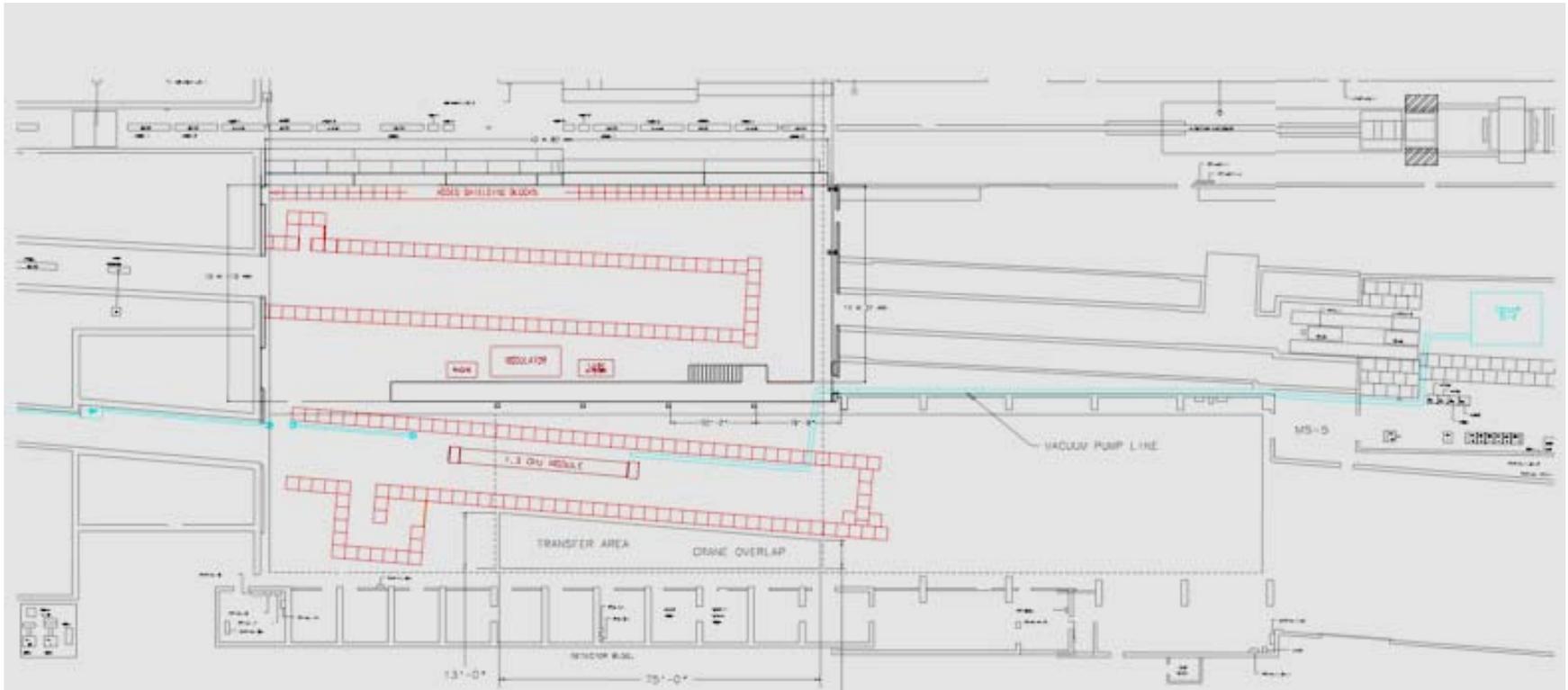
- ❖ Three satellite refrigerators operating as liquefiers
  - o 4000 liters LHe inventory + equal gas storage + controls
  - o Total power equivalent to ~ 90 Watts at 2 K
    - We are assuming 60 watts @ 2 K available
    - Remainder for 5 K shields
    - Higher temperature shields cooled with LN2
- ❖ Low temperature via vacuum pumping on helium
  - o Two vacuum pumps each capable of >10 g/sec @ 20 torr (2 K)
  - o Transfer lines are presently close to needed locations

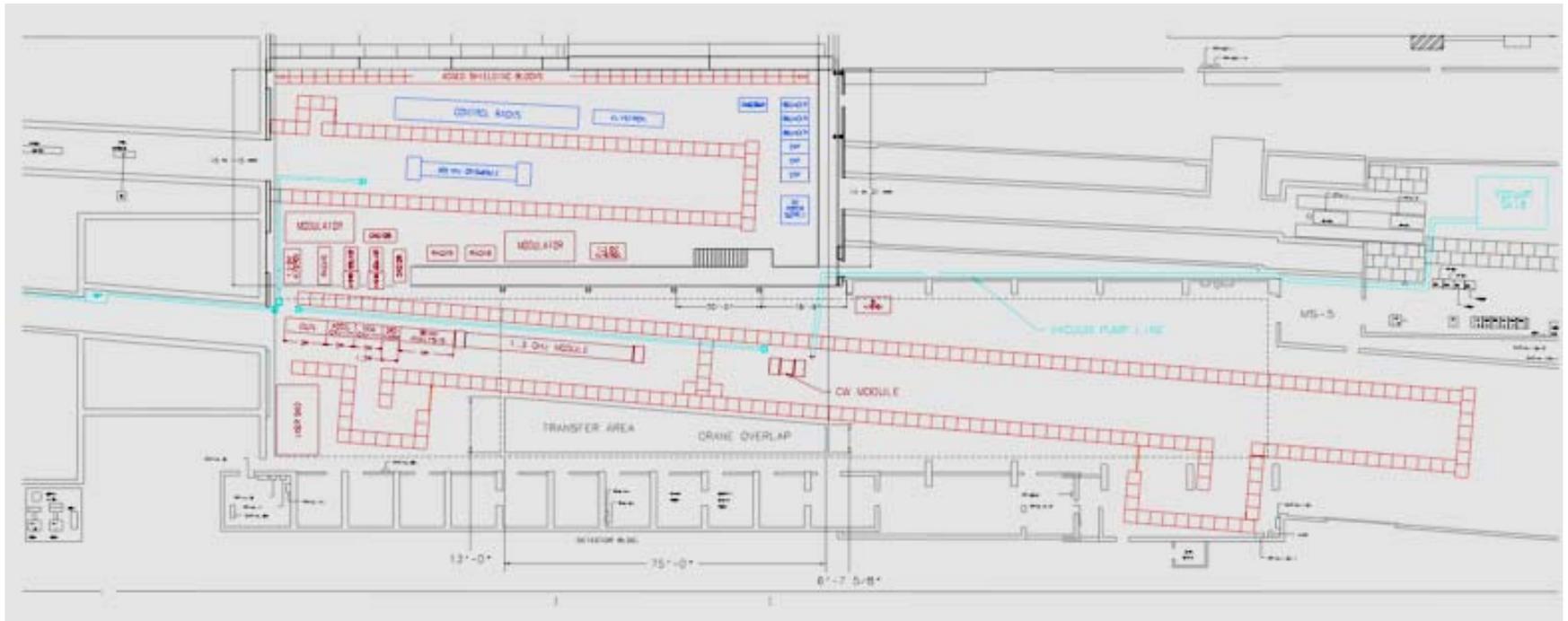


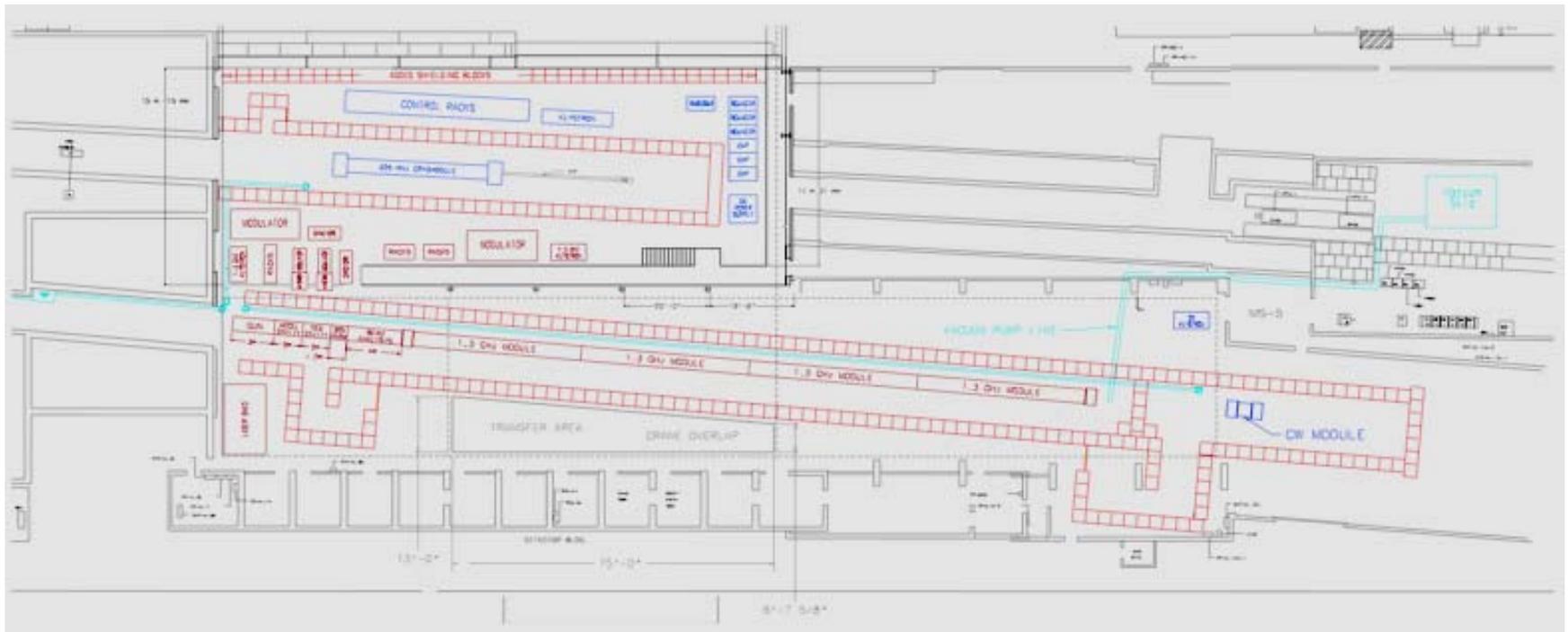
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## Present Cryogenic Distribution









- ❖ The three systems operate separately
  - o 2 K load for 20 MV/m CW ~ 50 W
  - o 2 K load for Photo Injector + four 1.3 GHz modules at 35 MV/m and 1 Hz is ~ 50 W
- ❖ Hence:
  - o Four 1.3 GHz modules at 35 MV/m operate at ~ 1 Hz
  - o Beam for CW module tests runs at reduced gradient in 1.3 GHz modules
  - o A short CW module operates at 2 K, probably not at 1.8 K
    - Vacuum pump limitation

- ❖ Estimated arrival of first 1.3 GHz module in ~ 18 months
- ❖ Goal is to have Phase 1 infrastructure in place at that time
- ❖ First steps:
  - Clean out the ME and MP beam line areas. Lots of shielding blocks, magnets, the flotsam & jetsam of an experimental program.
  - Install extensions to LHe transfer lines
- ❖ Time sensitive activities:
  - Add additional shielding before end of shutdown in six weeks. We have started this work.
- ❖ Planning & Design for Phase 3
  - New refrigerator -- Probably a hybrid design capable of lower temperature and much more power
  - Addition of cavity testing and conditioning capability

