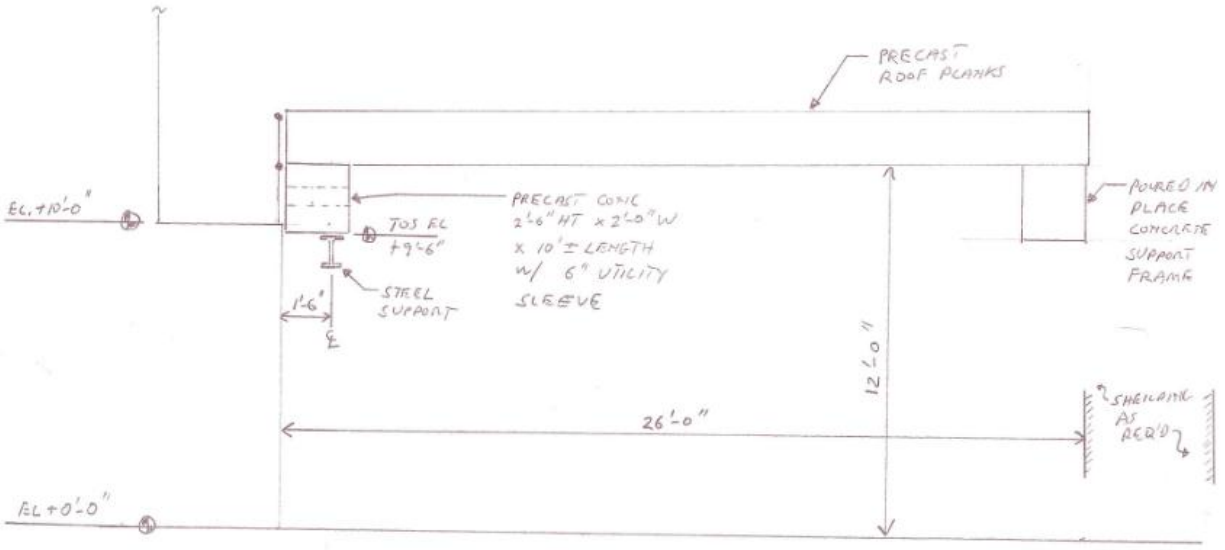
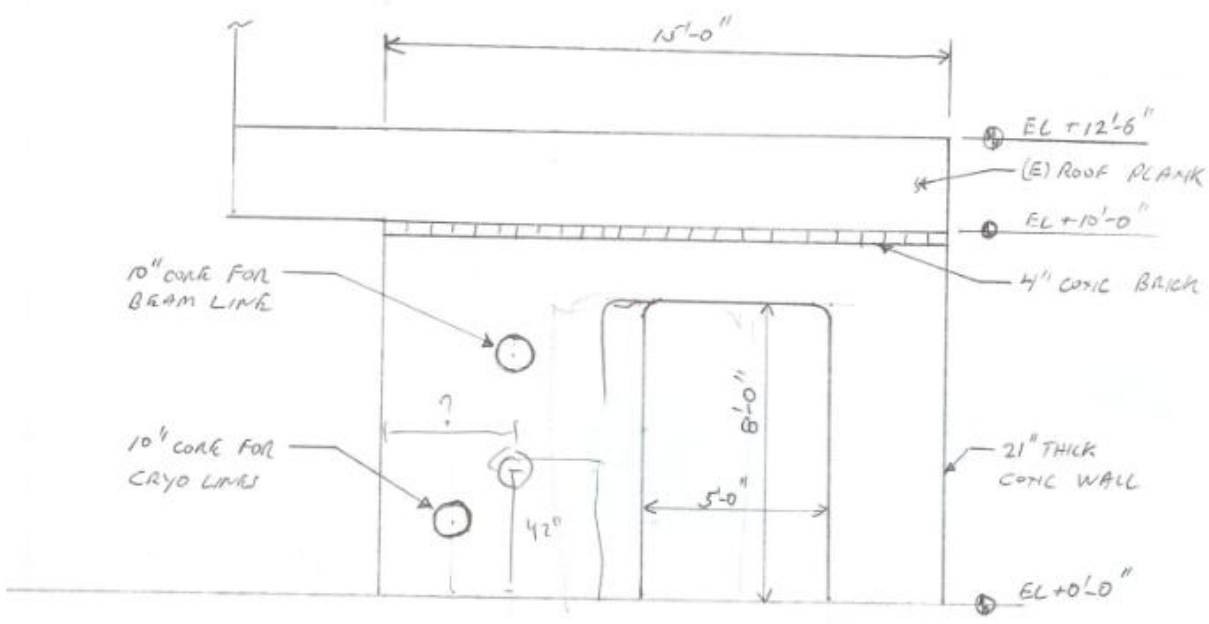


Tom Renzo proposed the following features for Cave 2. In both images, you are looking south toward Cave 1



SECTION C NEW CAVE, LKF SOUTH
 $1/4" = 1'-0"$



We came up with the following questions/comments:

- 1) How long will Cave 2 be? Answer: as long as possible. The outside wall of the North side of Cave 2 should line up with the existing yellow walkway. And per Rad Con's calculations, we assume the North wall is 6 ft thick.
- 2) Tom suggested an opening between the two caves 5 ft wide and 8 ft tall. We suggested 6 ft wide. But a wider opening might diminish structural integrity of this wall. Either way, we should be able to move the 1/4CM through this opening.
- 3) How far OFF the wall does HDIce live? Our plans today imagine the beamline approximately 50 inches displaced from the East wall. We think HDIce is approximately 4 ft wide, and centered on the beamline, so HDIce would extend 2 ft on either side of beamline. Consequently, this seems compatible with our 50 inch beamline displacement from wall. We won't need to introduce a "jog" or bend in the beamline. Viewed from above, the beamline will be straight. We will likely want to coordinate the placement of steel I-beams that will hold up the ceiling. I-beams every 18 to 24 inches, to maximize available space to work on HDIce.
- 4) HDIce will be approximately 8 ft in air, so Cave 2 with 12 ft ceiling seems fine.
- 5) How many core holes do we need in the wall between caves? One for beamline, and one for cryo plumbing. Do we need holes for LCW and our beamline cables? 10 inches diameter ok?
- 6) Roots blower inside Cave1 or outside? Pros and cons to both. Today, we are planning on leaving blower inside Cave1, and dealing with noise and heat the blowers produce.
- 7) Review RadCon's wall and ceiling thickness assumptions, pasted below:

Colleagues,

The purpose of this message is to provide the first assessment of the draft ITFU shielding design. I am referring to the latest version of drawings provided by Walt Akers, where **the side wall consists of two layers of 3 ft concrete blocks (6 ft total thickness) and 2-ft-thick concrete blocks spanning the roof.** The executive summary is that the proposed shielding is more than adequate for HDIce. This is a preliminary assessment. Following our shielding design tracking and approval process, the final design will undergo a QA check within RadCon and final approval by the Safety Configuration Management Board (SCMB).

HDIce plans to run approximately 900 hours, using a 5 nA average current about 80% of the time and a 100 nA average current the remaining 20%. The latter would be used for tuning, terminating the beam either in Faraday cups in the old injector cave or in the new experimental area. It is assumed that approximately 5% of the beam current could be lost anywhere along the beam line during normal operation, with an occasional 100% loss due to mis-steering. We are further assuming that all Faraday cups and beam termination points will have sufficient local shielding. Shielding estimates were done using source terms and attenuation factors from NCRP Report No. 51.

1) Side wall

A **side wall thickness of 3 ft** would be more than sufficient for HDIce parameters (if there were

no cracks between blocks). **The proposed 6 ft thickness would provide adequate protection for average beams up to 170 micro-A.** This is assuming the above 5% beam loss and using an acceptable dose rate limit of 50 micro-rem/h, i.e. JLab limit for a Radiologically Controlled Area (RCA).

2) Roof

The **roof composed of 2 ft thick concrete is adequate for the 5 nA beam.** At 100 nA, a 5% (point) beam loss could lead to dose rates marginally exceeding the RCA limit of 50 micro-rem/h. However, considering the running time in this regime, the total integrated dose in this area would not exceed the 100 mrem/year limit for members of the public (without even applying occupancy factors). The decision about posting this area will be taken based on radiation surveys.

3) 2nd Floor in Test Lab North Annex

Based on the results for radiation levels on the roof above, there is no concern for occupancy by non-radiation workers in this area.

4) Items needing attention

- The entrance maze needs to be modified, taking into account constraints that have not been fully discussed and resolved so far
- Penetrations in the side wall or roof

Please let me know if you have any questions or comments.

Thanks,
Vashek

Vaclav "Vashek" Vylet
Radiation Control Manager
Jefferson Lab
12050 Jefferson Avenue
Suite 602-5
Newport News, VA 23606
Phone: 757-269-7551

Questions related to the beamline:

- 1) There will be a fixed beam dump near the North wall of Cave 2. It will have shielding around it. It will be under vacuum or part of a system filled with helium. We started a conversation related to how the target connects to upstream and downstream beamline, thin aluminum window, valves? Where does HDIce live relative to the interior North Wall? Open question.
- 2) Beamline elements near HDIce: cavity bpm, raster, cavity bpm, harp or viewer for beam size measurement, insertable dump, valve, HDIce target, aluminum window, helium filled tube leading to fixed dump. Modification to my original drawing, no quad following the raster.

