

1. Emergency response procedures should be documented.

These are available at:

<http://lartpc-docdb.fnal.gov:8080/cgi-bin/RetrieveFile?docid=553;filename=LAPD%20Emergency%20Procedures.pdf;version=74>

1.a. The fire department should be familiarized with the area and what they should and should not do if they receive an alarm. We understand that arrangements have been made to do that.

Each shift of the fire department has been given a tour of PC4 that included discussion of the hazards and the appropriate response.

1.b. The actions operating personnel are to take in an emergency, particularly with regard to evacuation, should be clearly specified.

Item 1 notes the location of the emergency procedures.

1.c. We understand that the system is designed to be intrinsically safe, that the system is expected to be operated locally from the PC4 pit, and that some functions can be controlled via remote computer or from the surface.

Yes – in addition to other remote computer supplied functionality the liquid nitrogen supply can be remotely isolated (outside PC4) and the liquid withdrawal from the argon tank can be remotely isolated.

1.d. In the case of an ODH alarm, personnel should immediately evacuate the PC4 pit to an assembly area at the surface.

Agreed, this is part of the emergency procedures linked in item 1.

1.e. The assembly area should be specified. Means should be provided to know how many people are in the PC4 pit and to account for them at the assembly area.

The emergency procedures linked in item 1 mention that swapping a Fermilab badge for a PC4 entry badge is required (similar to MINOS entry). An assembly area sign will be placed in the PC4 parking area along with a no parking sign to keep this area free of vehicles.

1.f. A check should be made that controls necessary to place the system into a safe state are available at the surface.

The control system has been verified to work remotely.

1.g. In case of a power outage, ventilation of the PC4 pit will be lost and the ODH analysis will no longer apply. In that case, personnel should evacuate the pit. Minor changes to the controls and valves can be made first, provided an ODH alarm has not sounded and there are no indications of a significant system failure. An ample supply of flashlights should be available.

The emergency procedures linked in item #1 address a power outage. Eight flashlights have been added to PC4.

1.h. We understand that uninterruptible power will be provided for the PLC and controls for approximately 2-3 hours. Actions to be taken once the UPS has been drained should be specified. An evaluation should be made of the means by which temporary power could be provided and the cost / benefit of providing means for its connection.

Once the PLC is drained, the system will simply vent argon boiloff outside PC4 – no further actions are possible. No one other than the Fermilab Fire Department may enter PC4 while the power is off. The PLC has been tested to show that it automatically starts after a power outage and that it retains the appropriate variable data. The iFIX SCADA node also automatically restarts after a power outage. If the electrical infrastructure feeding PC4 suffers a significant failure, division management will have to weigh the cost of temporary power versus the cost of the liquid argon in the tank.

2. A list of system experts and personnel (and their contact information) should be provided. The list should match areas of expertise and responsibility with procedural requirements.

A list is available here:

http://lartpc-docdb.fnal.gov:8080/cgi-bin/RetrieveFile?docid=553;filename=expert_list.pdf;version=74

3. Prior to commencement of cryogenic operations, means should be provided to ensure access is limited to properly qualified personnel.

We've been told that locks will be re-keyed if necessary.

Underway.

4. Egress paths should be maintained free of obstructions and

extraneous materials and equipment should be removed.

These obstructions have been removed.

5. Backing for racks on the upper platform should be provided to reduce the potential for falling equipment.

Underway.

6. Combustibles should be removed from access paths and from below ladders / stairways.

The combustibles have been removed.

7. A confined space notice should be posted for the area above the main tank. Eric will provide a sign.

This has been posted on the tank center flange.

8. The door from PC3 to PC4 should be marked "no exit". Eric will provide a sign.

This has been posted.

9. Fire extinguishers and signs to clearly indicate their locations should be provided. It may be possible to address this in conjunction with the fire department walk-through.

A 2nd fire extinguisher has been added at the tank platform base by the fire department.

10. Emergency lighting should be provided. It could not be identified during our walk-through.

Underway.

11. The Panel agrees that administrative controls are sufficient to limit use of the crane to operations for which it is essential and to limit its use above piping systems. The crane should be locked out when it is not needed.

The crane will be locked out when it is not required.

12. An elbow should be added to the vent on the argon delivery line to

deflect vent flow from an operator's feet.

The elbow has been installed.

13. A wasp patrol should be conducted around the exterior of the building. (We know that has been started).

Underway.