

Effect of the Liquid Nitrogen Cooldown
on the ODH in Labs E and F

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The liquid nitrogen cooldown of the 30" Bubble Chamber will be accomplished with 160 l nitrogen dewars. There will be a total of four dewars in use at any one time. One will be used for cooling each half of the magnet and one will be on each nitrogen shield. The maximum amount of nitrogen in the building during most of the cooldown will be the 50 l in each of the two nitrogen operating dewars and eight 160 l dewars - four for filling and four for backup. This totals 1380 l. Near the end of the cooldown nitrogen will be allowed to fill the coils (80 l each) and about 160 l will be allowed to accumulate in each helium dewar. The maximum amount of nitrogen in the building at this time could be 1860 l.

Consider the extremely improbable - all 1860 l of liquid N_2 are dumped on the floor at once. This would produce a 8" layer of 77.4°K gas on the floor throughout the building or if warmed and mixed evenly with the air would lower the oxygen level to 18.8%. This does not present an ODH hazard. Consider the more probably - a supply line is broken or a dewar is damaged by a fork truck. This would involve at most a quarter as much liquid and obviously would cause no ODH hazard.

During cooldown all boiloff is vented directly outside. Nothing is routed through the computer/control rooms.

The four air handling units circulate 9700 CFM of air. Of this at least 15% (or 1455 CFM) is outside air. For an extended period 15% (or 218 CFM) of the outside air can be replaced. A leak of even 40 SCFM would easily attract notice. This is at least four times the anticipated use rate on any circuit. In addition the leak would be noisy and, if cold, would create a vapor cloud. A leak or leaks small enough to escape notice are so small they do not cause an ODH situation.

The liquid nitrogen cooldown of the 30" Bubble Chamber will generate no ODH problems in Labs E and F.