9. Access to the Drift Chamber Electronics: Confined Space

9.1 Introduction

The volume containing the drift chamber electronics and the tunnel leading to it are, under normal operating conditions, a Permit-Required Confined Space (PRCS). Only those personnel who have completed PRCS training may enter the region the region and they must follow the procedures outlined in the appropriate checklist when doing so.

A "normal" access is one that does not require removing a feedthrough from rear endplate. It is assumed to require removing the bulkheads (secondary gas seals) from the rear endplate, introducing a gas-hazard. The largest conceivable leak rate under these conditions is defined to be 10 times the current total leak rate, or 0.8 liters/min.

The supervisor or other responsible person must remain near the entrance during the access. If the region is left unoccupied during a permit-required access, the entrance will be blocked by a warning sign.

A "feedthrough repair access" requires removing a feedthrough and can lead to leaks as large as 40 l/min. The drift chamber will be filled with air for such repairs, so that the region will be a confined space but not a permit-required confined space. The presence of additional hazards would require a permit. A summary of the additional conditions that would require a permit follows the checklists.

9.2 Safety Hardware

Before anyone enters the region, an oxygen deficiency monitor is attached to an extension wand and used to test the atmosphere. Personnel within the confined space carry an ODM throughout the access.

Ventilation is provided during access by an air pump connected to a 2.5" diameter pipe that runs through the "raft" into the access volume. It supplies >9 ft^3/min (255 l/min), which at the largest conceivable leak rate, will ensure <25% of the lower-explosive limit for isobutane and >20.5% O2 content of the atmosphere.

A flashing light is located near the entrance of the access area to warn the supervisor of any gas alarms that could pose potential threats. An access is permitted during a gas alarm once the supervisor has established that it is safe to do so.

Depending on the work to be performed, it may be necessary to lock off the drift chamber high-voltage supplies.

9.3 Checklists

Two checklists are available depending on the nature of the gas in the chamber:

- "Permit-Required Confined Space": normal operating conditions, with helium-isobutane in the chamber;
- "Confined Space Permit NOT Required": final focus magnets present, but with air in the chamber.

Both are available from the DCh safety web site.

9.4 Other Hazards

If the chamber is filled with air, the access region does not require a permit for entry, unless additional hazards are present. The following email message from Joe Kenny summarizes these conditions.

From: Joe Kenny <jkenny@SLAC.Stanford.EDU>
To: Christopher Hearty <hearty@physics.ubc.ca>
Subject: Prohibited conditions in confined space

Greetings.

Access to the BaBar drift chamber, even with removal of gas hazards, becomes a permit-required confined space entry when hazards including but not limited to

-cryogens,
-magnets in RASK mode,
-welding or brazing,
-use of solvents (except H20-, simple green-, and pinene/terpene- based ones),
-painting (except H20-based),
-high-potting,
-running internal-combustion motors,
-powder- or compressed-air actuated nail guns

are introduced.

Other considerations must be made for overweight and disabled entrants.

--
Joe Kenny SLAC/ES&H/SHA | Dulce et decorum
jkenny@slac.stanford.edu | est non pro
"Is it safe?"-my dentist | supria mori.
