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The on-screen version of the Collider-Accelerator Department Procedure is the Official Version.
Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.*

C-A OPERATIONS PROCEDURES MANUAL

8.14 Confined Space Entry Procedure

Text Pages 2 through 5

Attachments

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: _____ ***Signature on File*** _____
Collider-Accelerator Department Chairman Date

A. Etkin

8.14 Confined Space Entry Procedure

1. Purpose

The purpose of this procedure is to define the steps that must be taken prior to entering any confined space in the C-A Complex that has been rated as Class 2, or any Class 1 space, into which a hazard may be introduced due to the work being performed.

2. Responsibilities

2.1 The ES&H Coordinator is responsible for:

- 2.1.1. maintaining an inventory of all Class 2 confined spaces on the C-A Department web page, and providing this inventory to BNL Fire-Rescue and Safety & Health Services Division Industrial Hygiene Group;
- 2.1.2. ensuring that all Class 2 confined spaces are posted with the correct sign, or have other means in place, such as bolts, locks or barriers, to prevent unauthorized entry;
- 2.1.3. approving all Class 2C confined space entries, using the Confined Space Entry Permit, such as the example shown in [C-A-OPM-ATT 8.14.c](#), and maintaining a record of the entry permits.

2.2 The Supervisor or Liaison Engineer for the area is responsible for:

- 2.2.1 ensuring that any possible confined spaces in their areas are inventoried annually, and that the inventory is supplied to the ES&H Coordinator;
- 2.2.2 approving all entries into Class 2A and 2B confined spaces via the Confined Space Entry Certification, [C-A-OPM-ATT 8.14.a](#);
- 2.2.3 assuring that any required atmospheric monitoring is conducted by workers qualified in using the monitoring equipment.

3. Prerequisites

- 3.1 Anyone entering a confined space shall have valid Confined Space Training, HP-OSH-016.
- 3.2 Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.
- 3.3 Certain equipment (such as TVDG) or experimental set-ups (such as Cerenkov counters), that use a hazardous or combustible gas, may have specific procedures written for venting and monitoring the atmospheric levels in their confined spaces.

These procedures shall be reviewed and approved by the ESH&Q Division prior to entering those spaces.

4. Precautions

- 4.1 Some confined spaces have pre-entry requirements, such as atmospheric monitoring. These requirements must be strictly adhered to. Atmospheric conditions that could present a hazard in confined spaces are:
 - a. Oxygen deficiency – less than 19.5% oxygen (normal is 20.9%)
 - b. Oxygen excess – greater than 23.5% oxygen
 - c. Explosive/Flammable gases – gas concentrations equal to or greater than 10% of the Lower Explosive Limit (LEL), sometimes referred to as the Lower Flammable Limit (LFL).
 - d. Toxic gases – if any toxic gas is suspected, a specific monitoring program must be developed through use of the Work Permit, and Confined Space Entry Permit (contact the ES&H Coordinator).
- 4.2 Any confined spaces that are classified as 2C, either by the confined space itself or because of the work being performed in the space, also requires a Confined Space Entry Permit, in accordance with [SBMS – Confined Spaces](#) (contact the ES&H Coordinator). Any hot work in a confined space elevates the space to a 2C confined space.
- 4.3 If any conditions change during the confined space entry, all entrants must exit the space. The Supervisor and ES&H Coordinator shall re-evaluate the space prior to any subsequent entries.
- 4.4 If work in any confined space is interrupted, all entry conditions shall be re-evaluated before work is resumed.
- 4.5 It is recommended that the supervisor insure that periodic contact be made with entrants in Class 2A and 2B confined spaces.

5. Procedure

- 5.1 Workers and/or supervisors preparing to enter a confined space, shall evaluate the work and the confined space, using the Confined Space Entry Certification (CSEC). If the confined space has written and approved procedures for entering, the CSEC form may be waived. A listing of C-A Confined Spaces is on the C-A Department web page [Confined Space List](#).
- 5.2 If atmospheric testing is required for the confined space, it shall be performed by workers qualified on the specific instrument to be used. It is preferred to bring the confined space monitor into the space with the workers, and to monitor the space continuously, for all Class 2 spaces.

- 5.2.1 Pre-operational checks should be performed once per day before the instrument is used, based on the potential hazard of the confined space. If oxygen deficiency is the only potential hazard in the space, the oxygen sensor can be tested by blowing into the sensor and watching for meter response. If other gases are potentially present, the equipment can be checked using a test gas available from the ES&H Coordinator.
- 5.3 If ventilation is required by the CSEC or Confined Space Entry Permit, employees may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere. The ventilation shall be directed to the immediate area where the employees will be working, and should direct the possible contaminant(s) away from the worker's breathing zone.
- 5.4 Lockout and Tagout of all hazardous energy sources shall be done in accordance with [ES&H Standard 1.5.1](#). When the power source cannot be controlled, movable components should be disconnected or blocked, and controls shall be tagged.
- 5.5 All electrical equipment being used in a confined space shall be protected by a Ground Fault Circuit Interruptor (GFCI), or be double insulated.
- 5.6 If the evaluation of the confined space determines that the space is, or will be, a Class 2C, a Confined Space Entry Permit shall be initiated by the supervisor and ES&H Coordinator, to control work in the space. The Confined Space Entry Permit shall include the following information:
- the space to be entered and the purpose of entry
 - date and duration of the permit
 - attendant, entry supervisor, and all entrants
 - hazards in the space
 - measures used to eliminate or control hazards before entry
 - acceptable entry conditions and means of verifying conditions
 - means of summoning the BNL Fire/Rescue Group
 - communication procedures to be used
 - PPE and rescue equipment, if applicable
 - any additional permits issued for work in the space
- 5.7 All employees entering confined spaces shall comply with the requirements of [SBMS – Confined Spaces](#).
- 5.8 It is recommended that the supervisor insure that periodic contact be made with entrants in Class 2A and 2B confined spaces.

6. Documentation

- 6.1 Confined Space Entry Certification forms shall be completed for each entry into a Class 2A or 2B confined space. This form shall be filed by the supervisor and retained for one year.
- 6.2 Confined Space Entry Permits shall be completed for each entry into a Class 2C confined space, and shall be retained by the ES&H Coordinator for one year.

7. References

- 7.1 [ES&H Standard 1.5.1 Lockout/Tagout Requirements.](#)
- 7.2 [SBMS – Confined Spaces](#)

8. Attachments

- 8.1 [C-A-OPM-ATT 8.14.a, “Confined Space Entry Certification”](#)
- 8.2 [C-A-OPM-ATT 8.14.c, “Example of a Confined Space Entry Permit”](#)