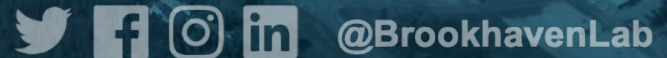




TAKE FIVE for Safety- C-AD LOTO Events in 2024

Wolfram Fischer

April 30, 2024



2024 Events related to LOTO

- CAD has had 3 LOTO events in the last 4 months.
- LOTO Lock not re-applied after completion of maintenance (January 29);
- Damaged Wires Discovered on Power Supply (April 3);
- Inadequate Electrical Pre-Job Briefing (April 26)

Title: LOTO Lock not reapplied after completion of Maintenance

SCBNL: E-01790

Date: 29 January 2024

On January 29, 2024, in Building 911, during a pre-job walkdown it was noted that a Complex LOTO for the Westinghouse Motor Generator Set which was applied in March 2023 was missing a lock. Subsequent investigation revealed that the LOTO was properly installed and then this lock was removed when the LOTO was temporarily lifted for shaft rotation with no other maintenance performed since the temporary lift and all covers and guards were in place. After discussion with the workers, engineers, CAD ESSHQ and the LOTO SMEs, it was decided to reevaluate and reapply the LOTO before performing any work. There was no potential for exposure and no injuries.

Potential Cause(s):

LOTO temporarily lifted to rotate the motor generator shaft

Immediate/Containment Actions:

- C-AD ESSHQ and LOTO SME investigated the scene.
- LOTO will be reevaluated and reapplied before any work can start.

Point of Contact: Jon Sandberg X- 4682



Damaged Wires Discovered on Power Supply

SCBNL: E-01828

Date: 1 April 2024

Description & Categorization Level: On April 1, 2024, during equipment check out, the AGS H10 Septum power supply could not be turned on. The following day, technicians found that safety grounds which were applied during Lockout/Tagout of the power supply had inadvertently been left in place.

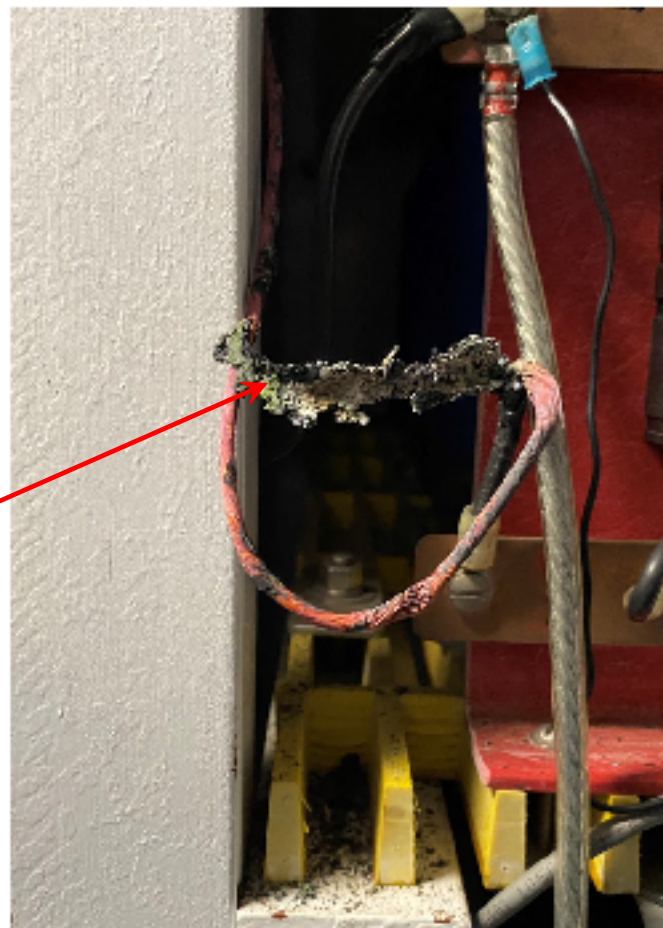
Potential Cause(s):

- There was a long delay from the time when the LOTO was applied until the locks were removed.
- Personnel did not recognize that the safety grounds had not been removed
- The attempt to energize the power supply with the grounds attached caused insulation damage to four wires within the power supply.

Immediate/Containment Actions:

- The Power Supply was Locked Out and put into an electrically safe condition for repair.
- Planning for repair and test of the power supply are ongoing.

Point of Contact: Jon Sandberg



TITLE: Inadequate Electrical Pre-Job Briefing

SCBNL: E-01849

Date: 26 April 2024

Description & Categorization Level: On April 23, at 8:20 AM, the Collider-Accelerator Support team responded to a power supply malfunction in Building 957. Unable to fix the issue, they consulted the system expert. An electrical briefing took place but was not documented. The team safely (wearing PPE) disconnected the power using the 480 volt disconnect. A Kirk key system for lockout/tagout (LOTO) procedures were implemented. The diagnosis involved multiple cycles of energizing and de-energizing the supply. It is not clear at the time of this report if required zero energy checks were performed each time. The problem was traced to a defective motor in the polarity reversing switch, which restricted the supply's functionality. Repairs were completed the next day, and no injuries were reported.

Potential Cause(s): Work Planning Less than Adequate.

Immediate/Containment Actions:

- Notification made to ORPS Categorizer.
- Personnel Interviewed.
- Investigation to begin.

Point of Contact: David Chan



Common Causes and Themes

- All three events related to LOTO procedures not being properly followed:
 - Lock removed for testing and not re-applied as required.
 - Grounding straps not removed prior to removal of locks and powering equipment.
 - Questions about properly performed zero-energy checks and inadequate pre-job briefings.
- All events involved experienced employees.
- One event (4/3) resulted in damage to equipment.
- No injuries resulted.

Executing LOTO

- The LOTO Process includes several procedural steps (notifications, setup, and removal) in addition to isolation, verification, Lock and Tag.
- All steps, including pre-LOTO and post-LOTO, must be completed to have a safe and compliant LOTO.
- Meticulous execution of all of the LOTO steps is needed to assure elimination of hazards to workers, and it is required by BNL SBMS.
- C-AD has many dozens of LOTO procedures. We are improving the quality of those procedures, but they **MUST** be followed.
- If there are any questions regarding LOTO, the ESSHQ Division is here to help!

The Take Away Message

- Following LOTO procedures is necessary to ensure a safe work environment for all.
- Not following proper LOTO procedures can result in injuries or equipment damage.
- Not following proper LOTO procedures impacts our ability to deliver a quality science program.
- The ESSHQ Division is here to help.
- NOT following LOTO procedures is NOT acceptable and will NOT be tolerated.