

ARC FLASH ALERT

Description of Los Alamos Event:

- On May 3, 2015, at Technical Area 53 (Los Alamos Neutron Science Center), a Laboratory electrician sustained a serious burn injury and eight other employees experienced respiratory distress while performing preventive maintenance on an electrical substation (switchgear and breaker maintenance).
- The electrician was medivaced to the hospital and remains hospitalized in critical-but-stable condition; eight other employees were transported to a hospital; seven were released and one with minor injuries remains hospitalized.
- Preliminary indications are that an electrical arc flash occurred on Buss B of the substation during the work execution. The cause of the accident is under investigation.



Discussion:

While we do not yet know the actual specifics of the causes of this event, this is an opportune time to remind ourselves of some important elements of our work planning process.

- **Understand the system or equipment you will be working on.** It is essential to understanding the hazards you may encounter (e.g., is there a back feed or parallel circuit?). If you do not have a good understanding of the system or equipment, consult with others who do.
- **Plan your work.** Don't count on luck. Include the scope of work to be performed, the hazards that may be encountered and mitigation for those hazards, and identify any special training that may be needed, such as Lock-out/Tag-out (LOTO). The level of detail in the work plan will depend on the complexity of the work, the coordination required between various groups and customers, and the ESH concerns that need to be addressed.
- **Do not work outside the work plan.** Conduct the pre-job briefing to discuss the work plan and make sure the work area is walked down with those involved before the start of work. Ensure everyone involved understands the hazards and instituted controls for each portion of the task; make sure what is being worked on is clear and understood (label equipment if necessary); and that everyone performing the work understands the work plan and any changes to the plan.
- **Develop a written complex LOTO procedure** when LOTO is required and two or more different job trades are working on the same equipment. A conversation on the procedures and differences in LOTO terminology is essential, especially when working with Utilities staff or contractors. In a complex LOTO, the Primary Authorized Employee coordinates work forces and ensures continuity of the LOTO protection.
- **Always wear the required PPE.** Wear electrical safety PPE correctly when verifying zero energy on the circuit. Unbuttoned, flame retardant clothing isn't going to provide much protection from an arc flash unless it's worn properly.
- **Verify that zero energy state, witness it!** Always assume the circuit is energized until proven otherwise. Always confirm your zero energy state if conditions change or when the job location is left unattended. Do not assume someone else checked it; it's your life, protect it.

LOTO Work Planning Checklist

Preparation:

- Understand what energy sources go into and exit the system/equipment.
- For complex LOTO, check for existing written LOTO instruction. If it exists, use it.
- For complex LOTO, if a written instruction does not exist, write one.
- Assure that type, magnitude, and hazards of all energy source(s) are considered.
- Assure you follow the required sequence of system shutdown.
- Consider nearby look-alike equipment in your work planning.
- Consider possible back feeds or parallel circuits in your work planning, especially when connecting temporary power in situations when equipment is taken out of service for repair or maintenance.
- Confirm isolation points using up-to-date drawings, and/or diagrams and/or ID tags.
- Confirm method of controlling the hazardous energy.
- Identify and obtain appropriate lock-out/tag-out device(s).
- For Complex Group LOTO, hold meeting with all participating Authorized Employees.
- Notify Affected Employees.
- Ensure equipment is safe to shut down.

Application:

- Set up work boundaries.
- Shut down the equipment donning appropriate PPE.
- For Complex Group LOTO, Primary Authorized Employee applies first lock to energy isolating device, hasp or lockbox, per LOTO instruction.
- All other Authorized employees apply personally identifiable lock, tag to energy isolating device or lockbox, per LOTO instruction.
- Challenge the lock/device to ensure they are installed securely.
- Attempt to restart the equipment.
- Verify the absence of hazardous energy wearing appropriate PPE.
- Relieve/render safe all potentially stored or residual energies.
- Always confirm your LOTO and retest absence of energy if conditions change, or when the job location is left unattended.

Removal:

- After completion of task, inspect the area to ensure the equipment is ready to be safely operated.
- Notify affected employees that the LOTO devices will be removed and the equipment may start.
- Verify operating controls for the equipment are off or in the neutral position.
- Reinstall all guards previously removed.
- Check that all employees are safely positioned.
- Remove the LOTO device(s) (for Complex Group, Primary Authorized lock is the last to be removed).
- Return equipment to service following the required startup procedure.
- If applicable, complete logbook closeout.