



**SAFETY ALERT - #13 - 2009**  
**ARC FLASH INCIDENT – No Loss**  
**RELEASE DATE: SEPTEMBER 9, 2009**

<b>Function:</b> Production Facility	<b>Incident Date:</b> April 23, 2009
<b>Incident Type:</b> Non Injury	<b>Country and Region:</b> Western Canada

**Summary:**

An arc flash occurred when a technician touched two exposed lugs of a 480-volt main breaker in a Motor Control Center (MCC) while performing commissioning checks.

**Description of Incident:**

During the course of commissioning a new 480v MCC, a contract technician was required to perform phasing checks on the exposed lugs on the line side of the 480v main breaker. The technician was using a commercially available set of phase sticks with a shepherd-hook style end. When the technician attempted to check the phase C lug, the hooked end of the phase stick came in direct contact with both B and C phase lugs. Spacing between the lugs was approximately 1". As per manufacturer's specification for this voltage, there were no barriers between the lugs. The resulting contact caused an arc flash.

While the worker was not injured, there is potential for an arc flash to cause serious burns. Explosive arc blasts can also occur causing damaging sound levels and exposure to a high pressure blast which could cause eardrums to rupture and lung damage.

Important investigation results identified that:

- An arc flash hazard study had been conducted on the MCC. The equipment involved in the incident was labeled and required HRC Category 2 personal protective equipment.
- The technician was wearing the required arc flash rated PPE
- In an attempt to demonstrate what happened, the technician, placed the phase stick back into the breaker cabinet and caused a second arc flash. The technician thought that because the breaker had been tripped that the lugs were de-energized.



**Phase B and C Lugs after the incident**



**Phase Stick Hook Used to Check MCC**



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**Causal Analysis:**

A detailed incident investigation was completed. The main causal factors were:

- The contractor's safety management process did not identify the training standards and procedures required for contractors to perform critical work.
- The contractor's standards did not address the hazards of working on exposed 480 volt terminals, barriers and breaker configuration for phase checking.
- The process of training electrical workers to become "qualified" and understand the hazards associated with arc flash were not well defined nor applied consistently with new workers.
- The 'shepherds' hook style phase stick was designed for testing overhead lines and was not the appropriate equipment/tool for checking this equipment.
- Hazard identification and controls were not implemented even though the work involved energized electrical parts.
- A Field-Level Hazard Assessment (FLHA) was not conducted prior to completing the phase checks to identify the hazards of performing this job.

**We Can Prevent Similar Incidents:**

This incident reinforces the importance of the electrical safety requirements identified in occupational health and safety regulations. In this case, the employer identified the following corrective actions:

- Review and enhance contractor selection process to ensure that training standards and procedures have been established for electrical contractors performing energized electrical work.
- Develop an Arc Flash Hazard Study standard consistent with industry standards. Ensure that all analysis are conducted in accordance with this standard and that the results are communicated to personnel performing maintenance work.
- Revise/enhance Company standards and training program to address arc flash and electrical shock hazards.
- Work on energized electrical equipment is a critical task and requires that a Field-Level Hazard Assessment (FLHA) be completed before beginning work.

**Additional Information:**

In addition to the Canadian Electrical Code (CSA C22.1-09), other relevant references include:

- CSA Z462-08 Workplace Electrical Safety.
- IEEE Standard 1584-2002 Guide for Performing Arc Flash Hazard Calculations

**Contact:**

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