



Safety Alert No. 506

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Arc Flash Incident Highlights Critical Need for Voltage Verification During Offshore Electrical Maintenance



Fig 1. Second-degree burn to technician's hand.

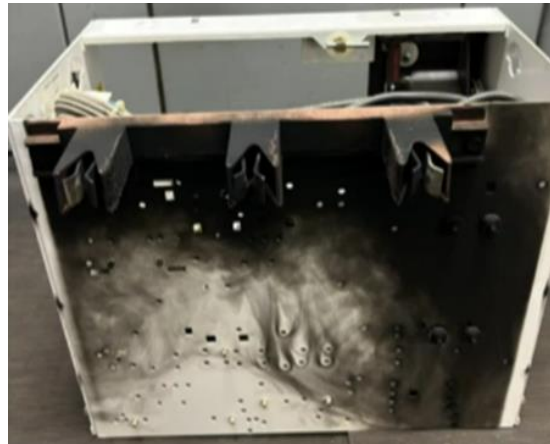


Fig 2. MCC bucket involved in the arc flash incident.

Background: An arc flash incident occurred during electrical maintenance activities on a 480V motor control center (MCC) aboard a fixed offshore facility in the Gulf of America March 21, 2025. Two contractor technicians were troubleshooting a tripped MCC bucket¹ (Figure 2) when an arc flash occurred.

One technician, despite wearing Category 2 arc-rated Personal Protective Equipment (PPE)², sustained first- and second-degree burns to the hands, arms, and face (Figure 1). The second technician was not injured.

Although the MCC had reportedly been de-energized and locked out, the investigation revealed that voltage verification at the load-side terminals was not performed. A source of

¹ **MCC Bucket** refers to a modular, removable unit within a motor control center that houses motor starters, circuit breakers, fuses, and other control equipment for an individual motor or load. Each bucket allows for quick replacement or maintenance without disrupting the entire MCC system.

² **Category 2 arc-rated PPE** refers to personal protective equipment with an Arc Thermal Performance Value (ATPV) or Energy Breakopen Threshold (EBT) rating of 8 to 25 cal/cm², as defined by NFPA 70E. This level of protection typically includes arc-rated clothing such as a long-sleeved shirt and pants or coverall, arc-rated face shield or hood, hard hat, hearing protection, leather footwear, and voltage-rated gloves with leather protectors, designed to protect workers from thermal hazards caused by arc flash events.

induced or backfed voltage remained present. When the technician attempted to withdraw the MCC bucket, this unidentified voltage source caused an arc flash and the release of stored electrical energy.

This incident underscores the critical importance of verifying zero energy at the exact point of work, regardless of Lockout/Tagout (LOTO) status, and highlights the need for strict adherence to electrical safety protocols in offshore environments.

Incident Findings and Contributing Factors

- The technician relied solely on upstream Lockout/Tagout (LOTO) procedures without verifying zero voltage at the work site.
- The job safety analysis (JSA) did not identify arc flash hazards or prescribe specific steps to prevent accidental contact with live components.
- Although wearing arc-rated PPE, the injured technician was not wearing insulated gloves, as required by the JSA and company policy.
- The injured technician used standard, non-insulated channel locks rather than insulated tools rated for energized environments.
- The MCC panel had exposed, non-insulated conductors, violating electrical safety policy.
- There was no radio communication with the control room, and no supervisory oversight was present during the task.

To help prevent similar incidents in the future, BSEE recommends that operators and their contractors, where appropriate, consider the following:

- Always test for voltage at the specific location of electrical work, regardless of LOTO status.
- Ensure JSAs and field-level risk assessments³ are thorough, hazard-aware, and include clear, actionable mitigation steps. These should be developed collaboratively with the work team and reviewed by a qualified supervisor.

³ **Field-Level Risk Assessments (FLRAs)** are dynamic, on-site evaluations conducted immediately before beginning a task. They are intended to identify task-specific hazards and assess real-time conditions that may not have been captured in broader Job Safety Analyses (JSAs). FLRAs involve direct participation from the personnel performing the work and are critical for adapting to changing conditions, reinforcing hazard awareness, and implementing appropriate control measures at the job site. **Note:** An FLRA does not replace the JSA—it supplements it at the point of execution.

- Require arc-rated PPE, including insulated gloves, for all energized electrical work. PPE should be regularly inspected and updated based on current arc flash assessments.
- Mandate the exclusive use of insulated, properly rated tools during electrical work. Conduct regular inspections to ensure tool condition and compliance.
- Require continuous radio communication for high-risk tasks and verify that personnel are trained and compliant with this protocol.
- Perform routine audits of electrical safety procedures, ensuring contractor safety practices align with operator expectations.
- Provide ongoing training on arc flash hazards, electrical safety practices, PPE requirements, and compliance protocols.
- Conduct comprehensive arc flash studies across all applicable equipment and facilities. Ensure appropriate PPE levels are assigned and that posted signage is current.
- Ensure proper supervisory oversight is established for the task.

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A Safety Alert is a tool used by BSEE to inform the offshore oil and gas industry of the circumstances surrounding a potential safety issue. It also contains recommendations that could assist avoiding potential incidents on the Outer Continental Shelf.