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## Multiple Arc Flash Incidents on Offshore Facilities

BSEE is aware of eight arc flash incidents that have occurred on the U.S. Outer Continental Shelf (OCS) since 2015. An arc flash is a powerful burst of energy that can travel 10 feet (3 m), reach 35,000° F, and produce pressure and sound waves strong enough to throw workers across a room.

Exposure to an arc flash hazard can result in hearing loss, respiratory damage, blindness, burns, other injury or death. The specific causes of the eight arc flash incidents reported to BSEE were:

- A worker with a conductive object was in close proximity to a high amp source;
- Dropped tools;
- Accidental contact with electrical systems;
- Equipment failure due to use of substandard parts, worn parts and improper installation;
- Breaks or gaps in insulation; and
- Corrosion, dust, and other impurities on the surface of the conductor.



(left) A flash captured on camera. (right) Proper warning labels advising workers of the dangers associated with working in an area where arc flashes can potentially occur.

Therefore, BSEE recommends that operators consider the following:

- Ensure all electrical systems follow 30 CFR 250.114 and API 14F, which references NFPA 70E, *Standard for Electrical Safety in the Workplace*. NFPA 70E provides guidelines that, if followed, should protect workers who may be exposed to arc flash and/or electric shock hazards;

- Conduct a risk assessment of arc flash hazards and implement control measures to protect workers against these hazards. The assessment and control measures should focus on both work activities designated as electrical work and routine activities which may indirectly may pose an arc flash risk;
- Develop and implement a documented “lockout/tag out program” to protect employees from electrical energy;
- Establish safe work procedures that avoid or discourage working on or around energized equipment. If work must be done on equipment that is energized, ensure that the hazards are identified, communicated and managed through tools such as a Job Safety Analysis (JSA), Personal Protective Equipment (PPE), and extra supervision and training;
- Install all arc barriers provided by circuit breaker manufacturers;
- Ensure circuit breaker cable connections are adequately insulated with materials appropriate for the physical environment and application;
- Ensure that offshore workers avoid standing in front of circuit breakers and switches on switchgear when operating them to avoid the potential projection of arc flashes;
- Make sure arc flash warning labels are installed in accordance with the guidelines of NFPA 70E on electrical equipment such as switchgear, switchboards, industrial control panels and motor control centers; and
- Ensure that all electrical one-line diagrams required by 30CFR 250.842 are kept up-to-date and available to personnel working on electrical equipment.

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A Safety Bulletin 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.