SAFETY ALERT

Safety Alert No. 395
September 28, 2020

Contact: David Nedorostek
Phone: (703) 787-1029

Electrical Equipment in Hazardous Locations Increase Risk of Fire

BSEE offshore inspectors have noted a developing trend of safety issues related to improperly installed and maintained electrical equipment in hazardous locations[1] on offshore facilities. Electrical equipment that has been improperly or poorly maintained can pose a fire and/or explosion risk if hydrocarbons are released or other flammable materials, such as hydrogen evolved from batteries, diesel, or natural gas, are nearby.

Identified safety issues related to electrical equipment include, but not limited to:

- Fixed or temporary electrical equipment not suitable for the hazardous location, as rated by API RP 14F or 14FZ;
- Electrical wiring not properly terminated nor color coded and, in some cases, not properly locked out;
- Corrosion of electrical equipment components (e.g. motors, pumps, instruments, junction boxes, etc.) that can potentially compromise the material rating for the designated hazardous area rating;
- Explosion-proof enclosures that have become corroded. In some cases, these enclosures are missing bolts, which can compromise the integrity of the enclosure to contain an explosion;
- Incorrectly rated electrical equipment to include non-rated portable electrical tools (PETs) (e.g. hand drills, portable electronic devices (PEDs), non-explosion-proof rated lighting, etc.) used in hazardous areas;
- Inadequately maintained electrical equipment in hazardous locations, such as damaged packing glands and seals, broken conduit, missing nameplates, mismatched color-coding, and exposed wiring;
- Poorly maintained files or records for certifying electrical equipment use in a hazardous location.

[1] Hazardous locations are areas classified where the possibility of fire or explosion can be created by the presence of flammable or combustible gases or vapors. Electric arcs, sparks, and/or heated surfaces can serve as an ignition source in such environments.

Most of these identified safety issues have occurred on aging facilities where maintenance is lacking. However, instances of incorrectly rated electrical equipment installed and/or used in hazardous locations on newer facilities have also been noted.

BSEE recommends that operators and contractors consider the following as a minimum:

- Ensure policies and procedures are current and in place to conduct regular tests and inspections of electrical equipment installed in hazardous locations;
- Verify that electrical equipment is fit-for-service;
- Ensure all electrical one-line and area classification diagrams, as required by 30 CFR 250.842, are up to date and available to personnel working on electrical equipment;
- Confirm that personnel who install or maintain electrical equipment in hazardous locations are trained on protection methods and proper maintenance in accordance with the original equipment manufacturer (OEM) and applicable standards for the specified hazardous location;
- Ensure hazardous locations on offshore facilities are classified according to API RP 500 (Class & Division) or API RP 505 (Class & Zones);
    - If an operator follows guidance provided in API RP 500 (Class & Division), ensure all electrical equipment installed in hazardous locations is designed in accordance with API RP 14F and is marked as such to display rated class, division, gas group, operating temperature or temperature range, etc.;
    - If an operator follows guidance provided in API RP 505 (Class & Zone), ensure all electrical equipment installed in a hazardous location is designed in accordance with API RP 14FZ and is marked as such to display rated class, zone, AEx[2] marking, protection technique, gas group and temperature code;

[2] The **AEx** marking validates that electrical equipment as being tested for suitability and performance by a Nationally Recognized Testing Laboratory (NRTL) to performance safety standards (e.g., Underwriters Laboratory and International Society of Automation.). Safety standards are developed by U.S.-based, standards-developing organizations and are often issued under the accreditation of the American National Standards Institute (ANSI).

- Confirm that all electrical equipment being installed and maintained in hazardous locations is listed and approved by a Nationally Recognized Testing Laboratory (NRTL)[3];
- Require a Hot Work Permit for any potential ignition source that is introduced to or created within hazardous locations;
- Ensure potential ignition sources[4] that are introduced to or created within hazardous locations are authorized only after a complete review of hazards and risks through a current Job Safety Analysis (JSA), or equivalent;
- Maintain control measures to reduce the risks to "as low as reasonably practicable" (ALARP) when potential ignition sources are introduced to or created within hazardous locations; and,
- Ensure the Safety and Environmental Management Systems (SEMS) elements are available to personnel and up to date, as required by 30 CFR 250.1900.

--BSEE--

[3] A Nationally Recognized Testing Laboratory (NRTL) is a private-sector organization that Occupational Safety and Health Administration (OSHA) has recognized as meeting the legal requirements in 29 CFR 1910.7 to perform testing and certification of products using performance-based test standards. BSEE only recognizes and accepts NRTL's listed electrical equipment in hazardous locations . This list can be found on OSHA's website: https://www.osha.gov/dts/otpca/nrtl/nrtllist.html.

[4] Potential Ignition Sources include but not limited to internal-combustion engine sparks; open flames from any source; welding operations; electric power tools; two-way radios and portable generators.