



Safety Alert No. 476  
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## Fatality Caused by Failure to Use Safety Devices with Temporary Test Equipment

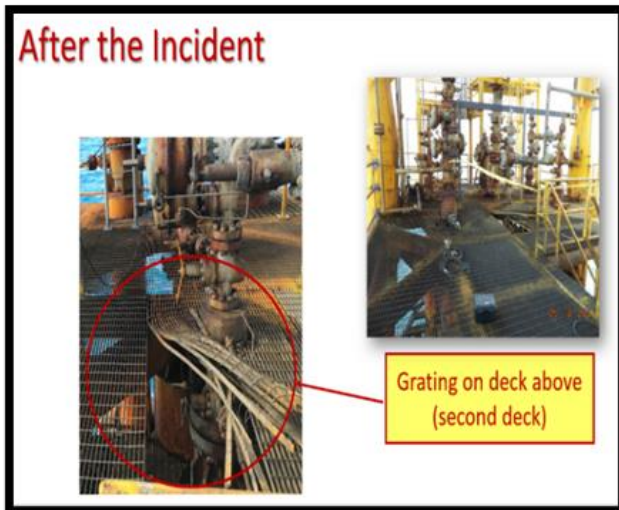


Figure 1 - Deformed grating above casing deck.



Figure 2 - Part of casing protruding out of well drive-pipe.

On May 15, 2021, an incident resulted in the fatality of an offshore worker when two production personnel were pressure testing a 16-inch well surface casing and an explosion occurred. The explosion entailed a high-pressure release with no signs of ignition.

Information obtained by BSEE during the subsequent investigation determined that personnel were using a high-pressure well to supply the pressure to the well casing. They installed temporary test equipment that included a high-pressure hose and a digital pressure gauge, but they did not use the pressure-regulating device and pressure safety valve during the pressure test.

The personnel first opened the surface safety valve to begin the casing pressure test on the 16-inch casing. They then opened the needle valve on the top of the source well

and the needle valve on the receiving well's 16-inch casing. The target test pressure was 250 pounds per square inch gauge (psig)<sup>1</sup>. Also, at the time of the test, the production personnel were unaware of the pressure rating for the 16-inch casing. As they were monitoring the test pressure, the 16-inch well casing exploded, releasing fluid through a 1½-inch opening between the 36-inch drive pipe and the wellhead base plate. The resulting surface casing failed due to overpressure, fatally injuring the worker.

The section of grating above the casing deck was disfigured and blown upwards from the explosion (Figure 1). Oil residue was observed on handrails, piping, and platform structure beams. The force was so powerful that the surrounding area handrails were disfigured; a section of the handrail was blown off the platform and never recovered. The paint on the surrounding structure beams was blasted down to the bare metal. On the casing deck, the force from the explosion created a slight bend upward of the wellhead 1-inch-thick base plate (Figure 2).

**BSEE's investigation identified the following:**

- The production personnel conducted a pressure test using temporary test equipment without using a pressure regulator and pressure safety valve, which resulted in the overpressure and subsequent explosion of the well's 16-inch casing.
- The operator failed to develop and/or implement a hazards analysis (facility level) and a Job Safety Analysis (operations/task level) for the activities on May 15, 2021, as required within its Safety and Environmental Management Systems (SEMS) manual.
- The production personnel failed to follow the Pre-job Planning Safe Work Practice, as required within its SEMS manual. By neglecting to follow this practice, the operator compromised the safety of personnel and deviated from the established protocols outlined in the SEMS manual.
- The ability to switch between output modes on the digital gauge created a potential scenario where the production operator could have inadvertently read the pressure displayed in units of bars instead of pounds per square inch.
- The operator neglected to carry out the necessary Management of Change (MOC) process before installing and utilizing temporary equipment, as explicitly

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<sup>1</sup> PSIG is the term for pressure specified by a gauge or other pressure measurement device. It gives the difference between the pressure in a pipe or tank and the pressure of the atmosphere (atm). Gauge pressure is measured relative to ambient atmospheric pressure.

outlined in its SEMS manual. This failure to adhere to established procedures posed a significant risk to personnel safety and operations integrity.

**BSEE therefore, recommends that operators and their contractors consider:**

- Ensuring that the pressure rating for all temporary equipment is verified to be compatible to specific application prior to use.
- Utilizing a pressure regulating device and a pressure safety valve to protect against overpressure anytime temporary equipment is utilized where the source pressure is greater than any downstream components' existing pressure rating.
- Implementing training sessions and raising awareness among personnel to enhance their proficiency in utilizing, interpreting, and accurately reading units of measurement recorded by all gauges and measurement devices. Proper understanding of how measurement devices are used is essential for maintaining safety protocols.
- Ensuring that a hazard analysis is thoroughly evaluated during the development of pressure testing procedures. This analysis should consider all potential hazards associated with the pressure testing operation. Furthermore, it is imperative to include the implementation of all necessary hazard mitigation measures.
- Establishing and documenting comprehensive procedures for assessing the potential hazards and risks associated with individual inactive wells. The outcome of this assessment should then be utilized to prioritize the abandonment process.
- Ensuring that all operations and contract personnel engaged in any pressure testing activities attend and actively participate in a pre-job meeting or toolbox talk. It is also essential to document the proceedings of these meetings. Furthermore, all operations and contract personnel should review the Job Safety Analysis (JSA) and ensure all hazards are acknowledged and policies, procedures, guidelines, contingencies, and communications are understood.

**BSEE reminds industry of the following:**

- The need to comply with 30 CFR § 250.867(c), "Temporary equipment associated with the production process system, including equipment used for the well testing and/or well clean-up, must be approved by the District Manager." Following this regulation will ensure that BSEE has an opportunity to review the temporary piping or equipment and help ensure that the temporary piping or

equipment complies with API Recommended Practice 14C, as well as all applicable production safety system regulations.

- The need to comply with 30 CFR § 250.1914 for safe work practices and contractor safety management. Specifically, paragraph (b) states that operators are responsible for ensuring and documenting that employees are “knowledgeable and experienced in the work practices necessary to perform their job in a safe and environmentally sound manner.”
- The need to comply with 30 CFR § Subpart S, 250.1900-1933 – Safety and Environmental Management Systems (SEMS). The requirements include, but are not limited to, understanding hazards before starting a job, communicating those hazards, ensuring personnel are competent to manage the hazards through proper mitigation methods, ensuring that equipment is capable of and suitable for managing and mitigating hazards, and that all personnel understand the use of and need for Stop Work Authority for any reason.
- The need to comply with 30 CFR § 250.1912 – that all individuals follow the company’s MOC policy and procedures when it comes to the installation and operation of temporary equipment. Furthermore, before initiating any pressure testing activities on the facility, workers should take the necessary precautions identified during the assessment and management of any changes made to the existing procedures or equipment as specified in mentioned policies and procedures.

Additional information is included in [BSEE Panel Report 2023-004](#).

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 in avoiding potential incidents on the Outer Continental Shelf.

**Category: Fatality, Explosion**