**Safe Work Requirement**

Pressure Testing Safety

work instruction

Table of Content

[1. PURPOSE 1](#_Toc477100254)

[2. SCOPE 1](#_Toc477100255)

[3. RESPONSIBILITY 1](#_Toc477100256)

[3.1 Rig Manager 1](#_Toc477100260)

[3.2 HSE Supervisor 1](#_Toc477100261)

[3.3 Operator 2](#_Toc477100262)

[4. PROCEDURE AND GUIDELINES 2](#_Toc477100263)

[4.1 Proof Testing 2](#_Toc477100265)

[4.2 Leak Testing 2](#_Toc477100266)

[4.3 Methods of Pressure Testing 2](#_Toc477100267)

[4.4 Hazards Associated with Pressure Testing 3](#_Toc477100268)

[4.5 Site Safety during Pressure Testing 4](#_Toc477100269)

|  |
| --- |
| PURPOSE Whenever rig well head have been reassembled, or when a newly erected system is being commissioned, it is important to carry out tests to check system integrity and detect any leaks before hazardous materials such as hydrocarbon gases or liquids are introduced under pressure.  The purpose of this instruction is to provide a regulation to control the risk and hazard during pressure test operation. SCOPE The most common pressure tests on a rig involve the BOP stack; choke manifold and high pressure mud piping from the mud pump to the swivel.  This instruction is applicable to all ECDC and clients well control equipment, to the extent that it does not conflict with the applicable OEM instructions. RESPONSIBILITY      Rig Manager The Rig Manager has overall responsibility for pressure test operation and safety issues. This includes overall responsibility for ensuring the system is in place to provide the means of operate and maintenance on the location.  The Rig Manager is responsible for implementing the approved pressure test safety work instruction at rig site where work is carried out under their control. Additionally, they shall ensure that any subcontractor who working under their direction are fully follow this instruction. HSE Supervisor The HSE Supervisor shall assist the Rig Manager in ensuring all related personnel are trained in the pressure testing.  The HSE Supervisor shall periodically verify the employee who performing the pressure testing are trained.  Providing advice on the use of all types of protective clothing and alarm equipment. Operator Understanding fully and applying correctly procedure in the course of their work at rig site.  Ensuring that safe working practices are being enforced at all times. PROCEDURE AND GUIDELINES There are two types of pressure testing in common use:   1. Proof Testing. 2. Leak Testing.  Proof Testing This is aimed at determining whether modifications to rig casing head have been carried out satisfactorily and whether the system is capable of operating at its design pressure. Proof testing involves the application of an applied load to induce stress greater than that generated in service but less than that which would cause physical damage. Leak Testing This is aimed at checking that joints, etc. have been properly tightened and that the system does not leak. Leak testing involves the application of a pressure differential across the pressure piping to detect leakage paths or leakage rates through the "pressure envelope" of the system. Methods of Pressure Testing  1. **Hydrostatic Testing:** This method should be used whenever practicable. Water is the most frequently used testing medium, except in cases where there is a danger of residual water combining adversely with the normal contents of the process system, or where there is a danger of residual moisture inducing subsequent hydrate formation. 2. **Pneumatic Testing:** Pressure testing using gas or air should only be carried out in exceptional circumstances, and where the use of any liquid is impracticable. Typical examples are where the supports of the system are incapable of withstanding the weight of the liquid used, or where the introduction of any liquid into the system would not be acceptable from a safety or product quality viewpoint.  Hazards Associated with Pressure Testing  1. **Hydrostatic Testing:** 2. A pre-job safety meeting shall be held with all personnel prior to the test and a Permit to Work shall be in effect during the test. 3. When hooking up the hand operated hydraulic pump, it is important to ensure that it has a relief valve set below the maximum design pressure of the system. The pump should also be fitted with a pressure gauge so that personnel carrying out the test are aware of the pressure in the system at all stages of the test. 4. When water or some other liquid is being used, it is vital to bleed all air out of the system, since pockets of residual air will become highly compressed causing failed component parts to be discharged at speed. 5. Steps should be taken to ensure that blanking-off devices are of the correct pressure rating and those items such as screwed plugs and connections have an adequate thread which is properly engaged. Systems undergoing pressure tests should not be subjected to any form of shock loading such as hammer testing. 6. Personnel not directly involved in carrying out the test should be excluded from the immediate vicinity of the system being tested. If this is not practical, protective screens should be used. 7. Portable signs or barriers are to be put in place warning people that a test is underway and that access is prohibited. 8. **Pneumatic Testing:** 9. A pre-job safety meeting shall be held with all personnel prior to the test and a Permit to Work shall be in effect during the test. 10. Before commencing the test, all non-return valves must be defeated. Where sight glasses are incorporated in the system, these must be excluded from the test. If there is a danger of other systems adjacent to the one under test being damaged, these must be depressurized and suitably protected before the test commences. 11. In parts of the system where threaded plugs or inserts are used, steps should be taken to prevent them becoming projectiles in the event of their failure. 12. All welded modifications should be X-rayed before testing work commences. A suitable safety valve, set to release air above the required test pressure, should be installed in the system, with two recently calibrated test gauges fitted, one as close as possible to the air supply and one close to the safety valve. 13. If a lubricated compressor is used to compress the air or inert gas and the discharge temperature from any compression stage exceeds 140 C there is a danger of explosion from mixtures of oil vapor and air. Lubricated compressors must not be used if discharge temperatures of more than 140 C are likely to be reached. 14. Portable signs or barriers are to be put in place warning people that a test is underway and that access is prohibited.  Site Safety during Pressure Testing  1. Equipment used to pressurize the system should be positioned in a safe place, and never left unattended when in operation. 2. Regular announcements must be made on the public address system or other communication systems to warn personnel where and when pressure tests are being carried out. Barriers and warning notices should be erected to exclude unauthorized personnel from the test site. In the case of low pressure pneumatic tests (up to 20 bar) the barriers must be at least 15 meters from the system being tested. For higher pressure tests, a 25 meter space must be left between the system and the barriers. 3. The operator of the equipment used to pressurize the system must be protected from high speed projectiles and the possibility of fire or explosion. This is particularly important for pneumatic testing. Vent points and relief valves must relieve in a safe direction away from the operator. All preparations must be carried out systematically and carefully and be re-checked several times before the test begins. The effects of failure of the system under test or other systems should be carefully considered and suitable protective measures adopted. If adequate protection cannot be guaranteed, work in adjacent areas should be stopped, and systems depressurized. Protective shields should surround any suspect area, e.g. where new components have been added. If there is any crane work above or adjacent to the systems under test, this must be stopped, since the sudden impulse load on the system caused by the crane dropping its load could result in serious damage. 4. The risk to personnel does not cease to exist once the system has been fully pressurized. Many accidents have resulted from attempts to remove test equipment, blanks, spades, etc., and to reinstate gauges and valves, before the system has been fully depressurized. Depressurization must be carried out slowly, to avoid the sudden explosive force damaging nearby equipment or injuring personnel, and reinstatement measures must wait until the pressure in the system is zero. At the end of the operation, pressure should be relieved slowly and in a controlled manner. An announcement on the public address system should be made on completion of the test and all barriers and warning notices removed. It is also important to remove tape from flanges to prevent moisture forming and leading to corrosion of gaskets. 5. **Record**    1. BSA-ECDC-HS-CL-S012-01-Well Control Check list v1.0    2. BSA-ECDC-HS-CL-S012-02- Nitrogen Purity Test Register v1.0 |