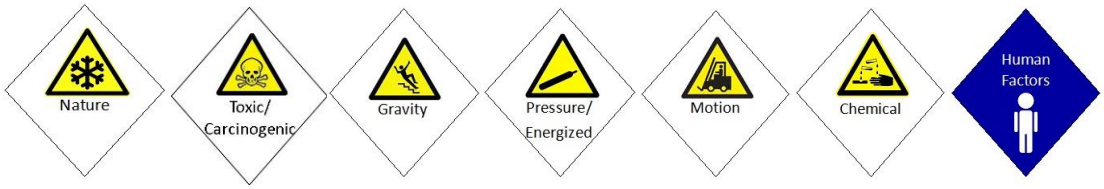
SAFE JOB PROCEDURE **SJP-09**

April 18, 2018 **PRESSURE TESTING - HYDROSTATIC**

PURPOSE/APPLICATION- To provide guidance and direction on the safe completion of a hydrostatic pressure test.

HAZARD SOURCES



PPE

- Canadian Plains Energy Services (CPES) Minimum requirements (Hard Hat, Safety Glasses, Safety Footwear, Gloves, Appropriate Protective Clothing)
- Face shields for all workers actively involved in bleeding or venting where they may be exposed to test medium
- Chemical protective gloves where required by test medium
- Fall protection equipment (where required)

TRAINING

- CPES eHIAC and WHMIS training
- Fall Protection (where required)
- Aerial lift training (where required)
- QC hydrostatic competency assessment

TOOLS/EQUIPMENT

- High pressure hoses, pressure gauges, mobile equipment (as required)
- Test manifolds, pressure trucks, pumps (gas/ electric etc.), blinds, spill containment, chart recorders, test medium, fuel, hand tools (wrenches, etc.), whipchecks, danger tape, hydro test signs, carber plugs etc.

PRIOR ACTIVITIES

1. Assess the work according to the CPES Hazard Identification Assessment Control (HIAC) process, completing the Pre-Job and/or Site HIAC, ensuring that the site hazard sources have been identified and assessed.
2. Communicate as per client requirements the estimated timing of the test to client representatives, QC representatives and all other contractors in concurrent work.
3. Review the purpose of the safe zone and a summary of the hazards and controls to all workers at the tailgate meeting; engage all other contractors on site do the same.
4. Inspect all tools and equipment prior to use.
5. Obtain any required Safe Work Permits and/or agreements.

NOTE: These are basic procedural steps for the safe execution of a hydrostatic pressure test. It does not contain all the specific technical specifications and guidance on performing the test. This procedure should be used in conjunction with the CPES Quality Control Hydrostatic Testing Guideline CP-Q-05 and any relevant customer requirements.

NOTE: Any work which must be completed on a system being tested must be completed at zero pressure. If, due to manufacture's specifications or owner requirements, work must be performed at pressure, a variance procedure must be completed. This variance procedure must be in accordance with all manufacturers' specifications and requires approval by the appropriate CPES Vice President prior to the start of work.

#	Job Steps	Hazards	Control Measures
1	Conduct pretest hazard assessment and Tailgate Meeting	❖ Pressure – Test pressure higher than allowed by the test package, different ratings on line components, unclear test pressures, air trapped in system ❖ Motion – Tripping hazards, possible slippery conditions ❖ Toxic – Properties of the test medium ❖ Human Factors – Lack of familiarity with procedure, lack of worker understanding of the risk factors, lack of communication regarding delegation of authority	▪ Complete pretest tailgate meeting (covering Safety and Quality Control), all workers to be involved in test must attend prior to the start of test. All emergency response information must be reviewed including muster areas and emergency contact information ▪ Verify that there is an assigned CPES Hydro Test Supervisor and if applicable, a designated QC Representative present. Communicate to all workers involved that only the CPES Hydro Test Supervisor is permitted to authorize any change in pressure or the opening/closing of any system components ▪ Verify that the Hydro Test Supervisor is available for the duration of the test, as he/she is required to be present ▪ Confirm the start time of test with the Client Representative and coordinate their presence if applicable ▪ Verify the CPES test package is present and assigned to the CPES Hydro Test Supervisor ▪ Review CPES CP-Q-05 Guidelines for Hydrostatic Pressure Testing at the tailgate meeting ▪ Review of CPES HIAC and this SJP during tailgate meeting ▪ Review the test medium MSDS during tailgate. Identify any specific PPE or first aid requirements and have the MSDS available during the test ▪ Verify all workers meet CPES PPE minimum requirements – CSA approved hard hats, safety glasses, protective

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			footwear, gloves, long sleeve protective clothing, additional PPE as required ▪ Verify availability of, and provide face shields were deemed necessary, any relevant chemical resistant gloves if deemed necessary
2	Walk Down of Test Line	❖ Pressure – lack of safe zone around test, difference in pressure ratings on the components of the test ❖ Gravity – Slip, trip and fall hazards, work at heights ❖ Motion – Congested work area, line of fire for hoses/ system components, traffic in test area ❖ Nature – Wildlife/ environmental conditions, rain, snow, mud, etc. ❖ Temperature – Cold conditions, wind chill, test medium ❖ Human Factors – Concurrent operations, people in the testing area	▪ Establish safe zone around test area using CPES HIAC methodology, based on the risk presented from the volume and pressure of the test ▪ Safe zone to be marked with red ribbon and a tag indicating the operation in progress ▪ Place warning signs to indicate that a pressure test is in progress ▪ Verify all components (gaskets, blinds, hoses, fittings, gauges etc.) being tested are rated for the highest test pressure ▪ Verify all test blinds are in place and that all valves to be included in the test are open ▪ Verify all non-included valves are closed ▪ Verify that all air has been removed from the system using the high point vents ▪ SWP #19 – Housekeeping – ensure all methods of egress are clear and remove any potential tripping hazards. ▪ SWP #06 – Working in Cold, SWP #68 Working in Heat – ensure all workers are dressed for conditions and breaks are scheduled to ensure the test is always monitored by the Hydro Test Supervisor ▪ QC Representative to verify test packages are in place and approved by CPES Supervisor and Client Representative ▪ Verify Client Representative is present prior to starting test, if applicable. ▪ All concurrent operations and crews must be informed of the test and kept from the area during the entirety of the process ▪ Sweep area for people prior to pressurizing test

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3	Final Test preparations	❖ Gravity – Slipping, tripping and falling at heights or same level ❖ Nature – Frost or snow on lines/ equipment/ Wildlife ❖ Pressure – Loose or falling material during test, loose joints, failure of built in pressure relief	▪ Verify all equipment and structures are designed and constructed to meet the pressure of the system being tested ▪ Verify all blinds and fittings are rated for the pressure identified in the test package ▪ When using pressure trucks, verify presence of relief valves where required ▪ Follow all steps of the CP-Q-05: 6.0 Pretest Examination ▪ Ensure footwear has appropriate traction
4	Begin Pressure Test	❖ Pressure – System under pressure, force from potential release of energy ❖ Toxic – Test medium, potential for spills/exposure ❖ Noise – Compressor/ equipment noise ❖ Motion – Line of Fire/ flying debris in the event of a failure, pressurized hoses ❖ Mechanical – compressors, pressure trucks, baker pumps, etc.	▪ Follow test plan pressures and hold times ▪ All pressurized lines must be secured using approved measures; such as whip checks, Chicago fittings, pressure unions, etc. ▪ Follow CPES CP-Q-05 – Prior to any worker entering safe zone, the pressure must be held for long enough to ensure it has stabilized ▪ Only authorized personnel may enter the restricted area ▪ The Hydro Test Supervisor must verify that the pressure has been reduced to zero before any work is performed on the system. This includes the tightening of any system components ▪ Hearing protection for all employees in the area if applicable
5	Pressure Test	❖ Pressure – Components under pressure ❖ Noise – Compressor/ equipment noise ❖ Motion – Flying debris/ pressurized hoses, etc., in the event of a failure	▪ Raise pressure in increments following the process outlined in CPES CP-Q-05 and the test package ▪ Keep all unnecessary personnel out of the work area ▪ Never check for a leak using your hand or any other part of your body ▪ Hydro Test Supervisor must be present for the entirety of the test unless a formal hand over with an alternate competent worker has been completed ▪ Test package must be in the possession of the Hydro Test Supervisor, or the Quality Control Representative throughout the entirety of the test ▪ The hydro test supervisor must verify

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			that the pressure has been reduced to zero before any work is performed on the system. This includes the tightening of adjustment of any system components
6	Depressurize System	❖ Pressure – Negative pressures ❖ Toxic – Test medium, spills, exposure ❖ Motion – Line of Fire	▪ Follow test package for stages and hold times to avoid dropping pressure too quickly ▪ Maintain safe zone until test pressure reaches zero
7	Dissemble testing equipment / Drain testing medium	❖ Toxic – Testing medium, spills, exposure ❖ Gravity – Slipping and tripping hazards, work at heights ❖ Motion – Lifting and moving system components, blinds, hoses etc., Mobile equipment ❖ Mechanical – Mobile equipment, slings, chain hoists, etc.	▪ Utilize mechanical lifting/mobile equipment for removing heavy blinds, hoses etc., whenever possible ▪ Position spill containment under all valves and joints/connections prior to disconnecting. Do not remove spill containment until lines are clear ▪ Verify tag lines and proper rigging equipment and procedures are used during dissembling, as SWP #54 Rigging ▪ Follow CPES housekeeping guidelines and SWP #22 Manual Handling ▪ Use fall protection equipment where required ▪ Appropriate hand protection must be worn at all times for manual handling of system components as well as protection from test medium where indicated by MSDS
8	Removal of Residual Test Medium through pigging or high pressure blow down (where required)	❖ Motion – Pigs /High pressure lines etc. ❖ Toxic – Testing medium, spills and exposure ❖ Noise – Air compressor and equipment noise ❖ Mechanical – Compressors and other equipment	▪ Follow all respective Pigging and Purging procedures in SJP #11 ▪ Verify that spill containment is in place prior to applying high pressure to lines ▪ Verify removal of test medium completed as per Client and CPES job specific requirements ▪ Verify proper pig sender and catchers are welded onto the lines as per SJP #11 where applicable ▪ Verify whip checks or other fittings are installed where required ▪ Verify that all valves are open prior to blowdown

ADDITIONAL PRECAUTIONS

- During the test it is critical to prevent other workers from entering the test zone.
- The assigned Hydro Test Supervisor must be present for the entirety of the test unless a formalized hand over to a competent worker has been completed.
- When given the option of test mediums, careful consideration should be given to the hazards presented by each option. H_20 is always the preferred medium whenever possible.
- No worker may be inside the test zone while pressure is being increased.

REFERENCES/REGULATIONS

Reference: Manuals/Codes/Standards/Regulations

Unless otherwise stated, refer to the latest editions of the following reference documents:

- CPES's Quality System Manuals
- American Society of Mechanical Engineers: ASME B31.1 and/or B31.3
- Canadian Standards Association: CSA Z662
- Alberta Boilers Safety Association (ABSA): AB 519 & AB 522
- Alberta Safety Codes Act (ASCA)
- Pressure Equipment Safety Regulations (PESR)

- CPES CP-Q-05 Guideline for Hydrostatic Pressure Testing
- CPES COP-05 Lock Out Tag Out
- CPES SWP-03 Blinding Blanking

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