

# Pressure Testing

Custodian: Strategic EH&S  
Date approved: October 25, 2013

## Purpose

This Practice establishes Encana-specific pressure testing guidance and process to enhance and improve the overall safety of operations associated with wells (onshore) early in their lifecycle.

Encana worksites must use this Practice as the basis to develop business unit, site, equipment, and process specific methods and techniques for pressure testing

## Definitions

Term	Definition
<b>Contractor</b>	A company Encana has selected to perform a service. The individual performing the service is specified (e.g., site representative or site supervisor) as acting as an agent for Encana.
<b>Energy Isolation</b>	The removal and/or control of any and all potentially harmful sources of energy
<b>Onsite Service Providers</b>	Service providers that perform work for Encana on an Encana field site (e.g., wellsite, pipeline, seismic line, road, and facility).
<b>PRV</b>	Pressure Relief Valve
<b>SARP</b>	The Encana Specification and Recommended Practice system
<b>Service Provider</b>	A company Encana has selected to perform a service without specifying the individuals who provide the service (e.g., Ensign Drilling or Halliburton).
<b>Staff</b>	Includes all Encana employees and contractors hired to conduct work on Encana's behalf.
<b>Testing media</b>	Refers to a product used to perform pressure testing on piping and vessels. Can be a liquid, gas, multiphase (e.g. water, water/methanol, water/glycol, steam, CO <sub>2</sub> , N <sub>2</sub> )
<b>QA/QC</b>	Quality Assurance/Quality Control

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## Scope

This Practice applies to all Encana's Canadian Division staff and onshore onsite service providers involved in early lifecycle well projects on Encana field worksites.

Primary Scope for early lifecycle wells has been identified to include:

- Setting up, rigging in for hydraulic fracturing/stimulation operations
- Conducting hydraulic fracturing/stimulation operations
- Conducting initial flow-back operations (including well testing), and,
- Well commissioning and initial production

Also in scope for this Practice are drilling operations and coiled tubing operations

## Application

This Practice is designed to apply to pressure testing with various media (e.g. gas and/or fluid) for both downhole and surface equipment

## Requirements for Early Life Cycle of Wells Pressure Testing

For activities listed in the scope, the following requirements apply to all equipment (including service provider equipment):

- Must be properly pressure tested to meet operating conditions (proof of testing documentation)
- Connections must be properly connected (e.g., torqued to industry / manufacturer specifications)
- Piping must be constructed and installed to industry standards and engineering specifications

## Pressure Testing Mediums

Encana's recommended pressure testing medium is water.

If other test mediums are utilized, engineering support and industry standards shall be incorporated to minimize the potential for system failures. Additional safety precautions shall be followed to minimize exposure to all personnel on the job site.

## Pressure Testing Procedure for Service Providers

The following procedures must be used during pressure testing operations:

- i. Pressure testing will be carried out on all temporary equipment and piping before use
- ii. Before using any equipment, check its pressure rating and ensure that this pressure is not exceeded.
- iii. All equipment must be clearly marked with its rated working pressure and have a valid certification stamp or banding. Supporting documentation must be readily available to the Encana site supervisor for verification.
- iv. A service provider representative, along with the Encana Supervisor in-charge of the operations will together conduct a pre-test safety tour. During this tour, the flow path will be checked as correct for the operation. The status of valves will be checked as open or closed per requirements. Pressure Relief Valves (PRV) and independent pressure limit switches will be installed in the system and checked to prevent over-pressurization. A record of this pre-test safety tour must be kept in tour sheet records, WellView, SiteView or equivalent system dependent on the site activities.
- v. Barriers and/or warning signs must be erected around the pressure testing working area. Refer to the *Restricted Access Practice* for more detail.
- vi. All pressure tests will be preceded by a low pressure test of 2070 kPa (300 psi). The pressure will then be increased slowly and smoothly in steps until the final testing pressure is reached. The standard period for all pressure tests is 10 minutes.
- vii. All pressure tests will be carried out with a pumping system that incorporates a tested PRV set to the required test pressure plus 10% (if the system incorporates an adjustable PRV). This PRV will be function tested prior to beginning the series of pressure test operations and will be witnessed by the Encana Supervisor

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- viii. Where a flow line requires PRV, the valve should be isolated during the pressure testing to ensure integrity of the line being tested will be above the rating of the PRV. The PRV in the flow line must be set to a maximum pressure of 10% below the rating of the flow line
- ix. In order to ensure that the equipment is protected during the pressure testing, the PRV on the pump itself will also be set to a maximum of 10% below the maximum test pressure of the equipment.

Additionally:

- a. Pressure tests must be documented either with a calibrated chart or electronic recorder. Where this is not possible, the pressure test must be recorded in tour sheet records, WellView, SiteView or equivalent system dependent on the site activities. Pressure tests records need to capture – at a minimum – the information listed below.
  - b. All PRVs should be braced and oriented in a direction to prevent exposure to personnel and equipment in the event of a discharge.
  - c. All high pressure pumps should be equipped with approved automatic overpressure shutdown devices. In the absence of automatic overpressure shutdown devices, PRVs capable of flow rates that will adequately relieve pressure must be used.
  - d. A high-pressure bleed-off line must be included in the piping configuration and have two plug valves installed in series immediately adjacent to the main line.
  - e. The valve closest to the main line must be the primary valve and must always be fully open or fully closed. It must be the first valve to be opened and the last valve to be closed.
  - f. The secondary valve must be used as a flow control valve.
  - g. Bleed-off line valves must always be opened slowly to prevent a fluid hammering effect.
  - h. Bleed-off lines are to be as straight as possible and correctly secured.
  - i. Only solid steel, high pressure pipe must be used for bleed-off lines.
- x. A successful pressure test is defined as a test resulting in no visible leaks and a minimum of 90% of final testing pressure retained for five minutes. No sustained drips or leaks are permissible on any flanges, valves, or swivel joint packing assemblies or weep holes.
- xi. If a pressure test is not successful, pressure shall be completely bled off the lines, the necessary repairs made with the bleed-off valves open. After repairs have been made, retest the line. Pumping shall not commence until a successful pressure test has been achieved.
- xii. Piping and equipment which repeatedly fail the pressure test and cannot be repaired to achieve a successful pressure test must be removed from service, clearly marked as “Reject” with paint to prevent it being mistakenly used.
- NOTE – All required Safe Work Permits will be completed prior the start of pressure testing.
  - CAUTION - Pressure testing against closed valves may result in damage to valves.

## Pressure Testing Documentation (each test)

- Name of testing company used (if any)
- Name of Encana and/or company personnel involved in testing
- Date/time of pressure test
- Pass/Fail of the pressure test
- Test medium used
- Pressure testing logs,(including test duration, test pressure) / signed and dated if in hardcopy
- Pressure testing recording charts (including pressure and temperature) / signed and dated if in hardcopy
- List of certified test equipment with documentation (gauges, deadweight/s, etc.)
- A record of any leaks or failures

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## Responsibilities of staff and service providers

Encana leadership, through the Environment, Health & Safety (EH&S) support group, is responsible for commissioning, developing, reviewing, and approving practices and specific procedures associated with pressure testing. Practices and procedures must be reviewed and updated to reflect approved changes in method and/or regulatory requirement.

### Business and site leadership

- Identify and communicate accepted and non-accepted methods of pressure testing for early lifecycle well operations
- Identifying responsibility for the testing of fabricated or installed lines
- Ensure that all facilities/sites under their control comply with the requirements of this Best Practice and associated procedures flowing from this Best Practice
- Ensure all applicable training is provided to field staff and records of training are managed accordingly

### Worksite Supervision

- Ensure barriers and warning signs are installed/maintained according to the requirements of the *Restricted Access Practice*.
- If required, develop site-specific procedures consistent with acceptable pressure testing methods
- Ensure that all pressure testing is performed in the presence of an Encana representative and that systems “under test” are not left unattended or improperly attended at any time
- Ensure all required testing documentation meets or exceeds Encana requirements based on method, project, media, etc.
- Ensure service providers are performing pressure testing activities in accordance with accepted methods of pressure testing
- Seek clarification concerning any practice or procedure through their immediate supervision
- Provide feedback to the business and corresponding EH&S groups concerning the value and effectiveness of this Best Practice and all associated procedures
- Ensure stop-work processes are fully communicated, and exercised when conditions change or deviations are required

### EH&S personnel

- Assist the business in complying with this Practice and its associated processes by familiarizing themselves with all accepted/non-accepted methods of pressure testing, site specific requirements, applicable regulations and industry guidelines
- Respond to questions or concerns relating to the interpretation of this Practice and all associated processes

### Service Providers

Service Providers performing activities listed in the scope of this document shall

- Perform and supervise pressure testing functions in conformance with only accepted methods of pressure testing as identified by Encana
- Have established procedures, codes of practice, and training/competency processes that meet or exceed both Encana and applicable regulatory requirements
- Work with Encana on-site supervision to ensure integrity and other specifications regarding pressure testing are clearly understood

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## Training requirements for staff and service providers

Role	Description
Staff	Impacted Encana staff and field supervisors must have this Practice acknowledged as part of their Talent Hub learning profiles.
Service Provider	Impacted service providers will have their requirements under this Practice communicated via Encana's <i>Onsite Service Provider EH&amp;S Expectations</i> document.

## Permits & Controls

### Permits

#### Business Unit & Discipline specific

- Safe work permits
- Hot work permits
- Confined Space permits
- Hazard Assessment documents
- Risk mitigation documents

### Controls

- Reference to applicable Encana SARP's and associated systems
  - Specifications
  - Recommended Practices
  - Management Plans
  - Engineering Technical Bulletins
  - Administrative document.
- Energy Isolation & Control
- Compatibility of test media with material to be tested
- Material integrity (pipe and pumping equipment designed, installed, and inspected in accordance with QA/QC processes)
- Contractor Management (ISN)

### Disciplinary actions

Role	Description
Staff	Appropriate disciplinary action up to and including termination must be taken based on the severity of the violation and individual circumstances.
Service Provider	Appropriate disciplinary action up to and including dismissal from the worksite and / or loss of contract services must be taken based on the severity of the violation and individual circumstances.

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## Regulations & reference material

Owner	Name
Alberta	<ul style="list-style-type: none"> <li><a href="#">Occupational Health &amp; Safety Code</a></li> <li><a href="#">ABSA</a></li> </ul>
British Columbia	<a href="#">OHS Regulation &amp; Related Materials</a>
Canada	<a href="#">CSA</a>
Encana specific	<ul style="list-style-type: none"> <li><a href="#">Pressure and Pipe Principles Fact Sheet</a></li> <li><a href="#">SARP's</a></li> </ul>

## Change management

To ensure alignment with current regulations, corporate policy, and industrial best practices, Encana's Canadian Division Safety Practices will be collectively evaluated annually and those practices identified for review will be prioritized and revised. Regulatory changes, changes in best practice and incident investigations may command a shorter review cycle. To suggest changes or provide comments, please email [CDEH&S@encana.com](mailto:CDEH&S@encana.com).

## Record keeping

Please refer to the Encana Canadian Division EH&S [Records Management Practice](#).

### Revision History

Rev	Description of Change	Date	Sign Off		
			Custodian	Reviewers	Approver
1.0	Updated language for clarity of expectations.	Oct. 25, 2013	Strategic EH&S	M. Lomenda K. Matiasz M. Sunstrum	B. Harrison