

**Quality Plan Requirements
for an
Alberta Owner-User Pressure Piping
Design Submission**

AB-531

Edition 1, Revision 2 – Issued 2018-05-15

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FOREWORD

As provided in PESR Sections 12(1)(e) and 16(1)(i), the Administrator in the pressure equipment discipline has established that ABSA Document AB-531, Quality Plan Requirements for an Alberta Owner-User Pressure Piping Design Submission, defines specific features of the QP process that must be addressed in the quality management system of an Owner-User that chooses to develop and implement a QP process for piping design submissions.

1.0 INTRODUCTION AND SCOPE

This document outlines the requirements for documenting and implementing the Quality Plan for pressure piping systems.

The Quality Plan is an alternative design registration process in contrast to the general review process of design registration. The general review process of design registration is a broad view of a design registration application to formally evaluate and examine compliance for the purpose of registration. The Quality Plan for pressure piping designs was developed by ABSA and Alberta Owner-Users to streamline the general design registration process through the development of quality assurance processes intended to enhance safety by ensuring the pressure piping design meets the owner's specifications, the construction code and the requirements of the applicable legislation for the purpose of registration. An Alberta Owner-User that chooses to implement the Quality Plan may do so under a Pressure Equipment Integrity Management System Certificate of Authorization Permit.

The Quality Plan establishes quality assurance for a pressure piping system design by establishing a process for documenting a review of the design documents and compliance with regulatory requirements that is performed by a Recognized Design Reviewer. The review by the Recognized Design Reviewer will confirm the pressure piping system design is compliant with the Pressure Equipment Safety Regulation Sections 14 and 16. The Quality Plan is intended for Owner-Users of pressure piping systems that have a Pressure Equipment Integrity Management System Certificate of Authorization Permit (AQP-8000 series).

AB-531 applies to pressure piping system designs that require registration in accordance with Section 14 of the *Pressure Equipment Safety Regulation*.

The *Pressure Equipment Safety Regulation* (PESR) establishes requirements that must be met by persons who own, operate, design, construct, install, repair, alter, or maintain pressure equipment or who provide related services to ensure that the pressure equipment is safe for operation.

AB-531 was developed to establish requirements and to provide detailed guidance for registration submission of pressure piping under the Quality Plan for pressure piping.

ABSA policy documents are developed through close cooperation with owners and other stakeholders; their input has been invaluable in compiling this document.

ABSA policy documents are living documents that are reviewed periodically to ensure that they are aligned with current industry practices. We would welcome any suggestions you have to improve this document. Please provide your comments to:

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2.0 DEFINITIONS and ACRONYMS

For the purpose of AB-531, the following definitions apply. Relevant definitions from the Alberta *Safety Codes Act* and *Pressure Equipment Safety Regulation* are also included in this section.

ABSA – is the organization delegated by the Government of Alberta to administer the pressure equipment safety legislation under the Safety Codes Act.

ABSA Safety Codes Officer (SCO) – means a safety codes officer, designated under the Act, in the pressure equipment discipline. [PESR 1(1)(ee)]

Act and Regulations – means the Alberta Safety Codes Act and the following regulations:

- Pressure Equipment Exemption Order (Alberta Regulation 56/2006),
- Pressure Equipment Safety Regulation (Alberta Regulation 49/2006),
- Power Engineers Regulation (Alberta Regulation 85/2003),
- Pressure Welders Regulation (Alberta Regulation 169/2002)

Administrator – means the Administrator in the pressure equipment discipline appointed under the Act. [PESR 1(1)(b)]

AER – means Alberta Energy Regulator

API – American Petroleum Institute

ASME – American Society of Mechanical Engineers

Competent – in relation to a person, means possessing the appropriate qualifications, knowledge, skills and experience to perform the work safely and in accordance with the Act. [PESR 1(1)(i)]

CSA – means the Canadian Standards Association. [PESR 1(1)(j)]

Integrity management system (IMS) – means a system for ensuring that pressure equipment is designed, constructed, installed, operated, maintained and decommissioned in accordance with the Pressure Equipment Safety Regulation. [PESR 1(1)(s)]

Owner – includes a lessee, a person in charge, a person who has care and control and a person who holds out that the person has the powers and authority of ownership or who for the time being exercises the powers and authority of ownership. [SCA 1(1)(v)]

Owner-user – an owner that has provided an Integrity Management System in accordance with the Pressure Equipment Safety Regulation and has been issued a quality management system Certificate of Authorization Permit under PESR Section 11(3).

PESR – means Pressure Equipment Safety Regulation, Alberta Regulation 49/2006

Pressure Equipment Integrity Management (PEIM) – a PEIM system is a quality management system that meets the requirements of AB-512 and for which the owner holds a Certificate of Authorization Permit in accordance with Section 11(3) of the Pressure Equipment Safety Regulations.

Pressure piping system – means pipes, tubes, conduits, fittings, gaskets, bolting and other components that make up the system for the conveyance of an expansible fluid under pressure and may also control the flow of the fluid. [PESR 1(1)(aa)]

QP – Quality Plan Requirements

QP Process Manager – is a person of authority and is responsible for the QP.

Recognized Design Reviewer (RDR) – This person is responsible for administering the QP, in whole or in part. This person shall be a person other than the pressure piping system designer.

3.0 GOVERNING LEGISLATION AND REQUIREMENTS

Legislation that governs the pressure equipment discipline includes the following:

1. *Safety Codes Act* (RSA 2000, Chapter S-1)
2. *Pressure Equipment Exemption Order* (Alberta Regulation 56/2006)
3. *Pressure Equipment Safety Regulation* (Alberta Regulation 49/2006)
4. *Power Engineers Regulation* (Alberta Regulation 85/2003)
5. *Pressure Welders Regulation* (Alberta Regulation 169/2002)
6. *Administrative Items Regulation* (Alberta Regulation 16/2004)

4.0 REFERENCED CODES AND STANDARDS AND OTHER GOOD ENGINEERING PRACTICES

The adopted codes and standards and other recognized and generally accepted good engineering standards that are cited in AB-531 are listed below. Section 6 of the PESR provides a full listing of the codes and standards that are declared in force.

CSA B51 – *Boiler, pressure vessel, and pressure piping code*

CSA Z662 – *Oil and Gas Pipeline Systems*

ASME B31.1 – *Power Piping*

ASME B31.3 – *Process Piping*

5.0 GENERAL

The owner has the ultimate responsibility for all pressure piping within their care and control and to ensure an IMS is in place for their pressure piping systems. The IMS is intended to ensure that the pressure piping systems are designed, constructed, installed, operated, maintained, and decommissioned safely. This document establishes the QP for pressure piping systems that supplement the requirements of the AB-512 Owner–User Pressure Equipment Integrity Management Requirements. The QP shall be a written process description documented and controlled within the owner’s PEIM.

As part of an owner’s PEIM, an element of design process shall be established to:

- assess whether the proposed design meets the owner’s process and mechanical requirements;
- assess compliance to the regulatory requirements;
- assess whether the technical design is compliant with the code of construction;
- assess the completeness of the design documents;
- provide design recommendations; and
- propose design improvements.

In addition to the above, the QP must address the following elements:

- the owner’s requirements;
- management responsibilities;
- control of documents and records;
- competency and training of the RDR;
- control of the design;
- control of the monitoring; and
- continual improvement.

The scope of the activities to be undertaken shall be documented as part of the description of the QP. This will include the types of pressure piping systems that the RDR is responsible for reviewing prior to submitting the design submission package to ABSA for registration.

The documented QP scope shall only include pressure piping systems.

5.1 Owner’s Requirements

The pressure piping system design will be verified against the owner’s requirements. The owner has the responsibility to assign competent personnel to ensure the design satisfies those requirements.

5.2 Responsibilities of Management, QP Process Manager and RDR

Management responsibilities have been established as part of the owner's PEIM. The management responsibility previously established shall be supplemented by the following.

It is important for management to clearly define the responsibilities of the RDR and to ensure there are adequate resources to implement the QP.

Management provides the authority to the RDR who administers the QP. It is important that the RDR has the means to assess the piping design and has authority to provide design recommendations and improvements.

Any required experience, qualifications, or training that is critical to administering the QP shall be identified for the RDR. There shall be documented evidence of assessment or re-assessment, as applicable, as well as verification of competence for the RDR.

5.2.1 QP Process Manager Responsibilities

The QP Process Manager is a person of authority who has the ownership and control of the QP.

The responsibility of the QP Process Manager is to document the QP. The QP Process Manager ensures the documented process conforms with the established Owner-User PEIM and that the process produces a design submission package that is in compliance with the regulatory requirements. The QP Process Manager is responsible for correcting any QP deficiency that results in a failed registration through the corrective action process in the PEIM. A failed registration is a piping design submission that has been rejected for registration by ABSA.

The QP Process Manager will be responsible to nominate an individual to be the RDR by assessing an individual's qualification and verifying competencies for the purpose of administering the QP. The QP Process Manager shall nominate the RDR by completing Form AB-260, RDR Nomination Letter. The QP Process Manager will ensure that the RDR is current with the latest applicable codes, standards, and regulations that apply to the pressure piping system design. The QP Process Manager will ensure that the RDR is aware and knowledgeable of the owner's PEIM requirements.

5.2.2 QP Process RDR Responsibilities

The RDR is responsible for administering the QP. For the purpose of the QP the RDR shall be a person other than the pressure piping system designer. The RDR is responsible to ensure that the appropriate person

has reviewed the pressure piping design document and that the design complies with the Safety Codes Act, regulations, and code of construction, prior to submitting the design documents for registration.

The RDR shall provide an impartial review of the design documents, as listed in PESR Section 16 and section 5.3.1 below. The review shall:

- assess whether the proposed design meets the owner's process and mechanical requirements;
- assess compliance to the regulatory requirements;
- assess whether the technical design is compliant to the code of construction;
- assess the completeness of the design documents;
- propose applicable design recommendations;
- propose applicable design improvements.

The RDR shall be satisfied that the documents are in compliance with the above requirements. The RDR will provide the design documents, a QP Covering Letter, a completed Form AB-31 and a completed Form AB-96. The QP Checklist form will be completed and certified by the RDR that the submission package is in compliance with the Owner-User's QP and PESR s16.

5.3 Control of Documents and Records

As part of a PEIM, an element has been established for controlling documentation and records. The AB-512 Owner-User Pressure Equipment Integrity Management Requirements refer to this as Quality System Documentation and will be supplemented by the following.

5.3.1 Documentation

The design documentation shall be in a manner acceptable to the owner and in compliance with the *Pressure Equipment Safety Regulation* and will supplement the requirements of the PEIM.

The RDR is responsible to ensure the following listed documents are submitted to ABSA for registration under the QP:

- Form AB-31: Design Registration Application
- Form AB-96: General Engineering Requirements for Design & Construction of Pressure Piping Systems
- QP Checklist form
- QP Covering Letter describing the scope of the submission
- Piping and Instrumentation Diagram
- Piping Line Designation Table
- Piping Material Class Specification
- Pressure Relief Valve List
- Overpressure Protection by System Design (If applicable)

- Tie-In welds that are impracticable for hydrostatic or pneumatic testing (If applicable)
- Hydrostatic Test Waiver form (If applicable)

5.3.1.1 Form AB-31

This form is required for all submissions for registration of pressure equipment. For further details, refer to the ABSA website. (www.absa.ca)

5.3.1.2 Form AB-96

This form is required for all pressure piping system registrations. Note that section 10 of Form AB-96 identifies the registered Professional Engineer who is responsible for the pressure piping system design. For details on how to complete this form, refer to Form AB-96a Guide for Completing Form AB-96. For further details, refer to the ABSA website. (www.absa.ca)

5.3.1.3 QP Checklist Form

The QP Process Manager and RDR shall create a checklist form as part of the documented QP. The checklist form is a comprehensive list of items reviewed by the RDR to ensure that the submission package is in compliance with the Owner-User's QP and PESR Section 16. Form AB-31b Minimum Required Information for Pressure Piping System Submissions, may be used as a guide to develop the QP Checklist.

5.3.1.4 QP Covering Letter Describing the Scope of the Submission

The purpose of this letter is to confirm the scope of the submission package. The RDR provides a summary description of what is to be registered and confirms that this submission package scope is within the Owner-User's QP scope.

The QP Covering Letter can also be used to identify any parts of the submission package that are excluded from the Owner-User's QP scope. For example, AB-525 Other Means of Overpressure Protection.

5.3.1.5 Piping and Instrumentation Diagram

A diagram that shows the piping, equipment instrumentation, and control that is the framework for design, construction and operation of a facility.

5.3.1.6 Piping Line Designation Table

This table describes the design considerations for each piping line including overpressure protection and important information regarding installation, testing, and location of the piping line.

A typical Line Designation Table includes, but is not limited to, the line identification with size and schedule, the design pressure and temperature, minimum design temperature, test pressure, applicable piping material class and originating P&ID, as well as indicating whether the line is within the scope of registration.

5.3.1.7 Piping Material Class Specification

This document describes the materials used for constructing the pressure piping system. The piping material class will include the material specifications, size, schedule, level of non-destructive examination, and primary service rating of all pressure pipe fittings.

5.3.1.8 Pressure Relief Valve List

This Pressure Relief Valve List describes the new or existing PRVs which protect the pressure piping system that is submitted for registration. This list includes the PRV tag number, set pressure and location and the equipment or piping line the PRV protects.

Refer to AB-525 Overpressure Protection Requirements for Pressure Vessels and Pressure Piping.

5.3.2 Records

The design records shall be in a form acceptable to the owner and will supplement the requirements of the PEIM. These records must show the required authentication and be protected from unauthorized alteration.

The retention period shall be established as part of the owner's PEIM.

5.4 Competency and Training of the Recognized Design Reviewer

The RDR shall have the responsibility to ensure that the proposed design meets the owner's process and mechanical requirements as well as the regulatory requirements. Continued training is essential to ensure that the RDR is aware of all the current requirements.

A formal nomination, Form AB-260, must be submitted to ABSA. The RDR must be accepted and recognized as an RDR by ABSA prior to the RDR administering any QP processes.

As a minimum, the RDR shall have the following experience and knowledge:

- Professional Engineer with experience in pressure equipment design or comparable knowledge and experience in pressure equipment design determined by the QP Process Manager.
- experience with documents such as Process Flow Diagrams and Line Designation Tables.
- working knowledge of this document and the following documents:
 - Safety Codes Act (RSA 2000, Chapter S-1)
 - Pressure Equipment Safety Regulation AR 49/2006
 - Pressure Equipment Exemption Order AR 56/2006
 - AB-506 - Inspection & Servicing Requirements for In-Service Pressure Equipment
 - AB-508 - Safety Codes Act Flow Chart
 - AB-512 - Owner-User Pressure Equipment Integrity Management Requirements
 - AB-513 - Pressure Equipment Repair and Alteration Requirements
 - AB-516 - PESR User Guide
 - AB-519 - Alternative Test Methods Procedure Instructions
 - AB-522 - Standard Pneumatic Test Procedure Requirements
 - AB-524 - Pressure Relief Devices Requirements Document
 - AB-525 - Overpressure Protection Requirements for Pressure Vessels and Pressure Piping
 - AB-529 - Pressure Equipment Exemption Order User Guide
 - CSA-B51 - Boiler, pressure vessel, and pressure piping code
 - CSA Z662 - Oil and Gas Pipeline Systems
 - ASME B31.1 - Power Piping
 - ASME B31.3 - Process Piping
 - API-520 Sizing, Selection, and Installation of Pressure-relieving Devices Part 1 and 2.
 - API-521 - Pressure-relieving and Depressuring Systems
 - IB10-006 - ABSA Requirements for Steam Pipelines
 - AER Directive 077 - Pipelines – Requirements and Reference Tools
- The following seminars which clarify regulatory requirements are recommended for the RDR

- Pressure Equipment Safety Legislation (PESL) Seminar
- Design Registration Seminar
- Pressure Piping Fabrication Requirements and Quality Control Seminar

The RDR shall perform an initial demonstration of the QP to an ABSA Design Survey Auditor. The purpose of the initial demonstration is to verify that the QP is integrated as part of the owner's PEIM and that the QP is effective in producing a deficiency-free design submission for the purpose of registration, before submitting under the QP. A deficiency-free design submission is a design submission which considers and complies with Owner-User requirements, code of construction, and regulatory requirements. Upon successful completion of the initial demonstration, the RDR will be provided with a Letter of Recognition which confirms the RDR has been accepted by an ABSA SCO to administer the QP. Failure to meet regulatory requirements or the intent of the QP may result in withdrawal of recognition for the RDR.

The initial demonstration shall involve the QP Process Manager, RDR, and ABSA SCO whereby the RDR will confirm that all process functions have been performed. In performing the process steps, the RDR will confirm that the design and pressure piping submission package to ABSA for registration:

- meets the owner's process and mechanical requirements;
- complies with the regulatory requirements; and
- complies with the code of construction.

5.5 Monitoring

The QP Process Manager shall apply a method of monitoring to measure the effectiveness of the QP. The method of monitoring shall have the ability to assess whether the QP is achieving the planned submission package for registration.

5.6 Continual Improvement

The QP continual improvement goal is to improve the process, capabilities, and efficiency of the Owner-User's processes in an effort to deliver a safe and effective pressure piping system.

As part of an owner's PEIM, an element of continual improvement has been established with a documented procedure for corrective and preventative action program. The corrective and preventative action program procedures apply to the QP and a design submission package that has a deficiency or results in a failed registration. Any actions used to correct a design submission package deficiency shall be applied to the submission and all affected submissions.

6.0 AUDIT

Internal audits of the QP will be performed as specified in the owner's PEIM to determine its effectiveness.

This QP may be reviewed at the PEIM renewal or surveillance audit.

7.0 REVISION LOG

Edition #	Rev #	Date	Description
1 st Edition issued 2016-04-01			
1	1	2017-04-20	<ul style="list-style-type: none"> - Changes to Definitions and Acronyms - Changes to QP Process RDR Responsibilities - Changes to Competency and Training of the Recognized Design Reviewer - Editorial changes throughout
1	2	2018-05-15	Reaffirmation & clarified RDR Qualification on page 11.