

# **Pressure Piping Construction Requirements**

**AB-518**

Edition 9, Revision 0 – Issued 2022-09-19

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## FOREWORD

As provided for under Sections 11, 12 and 13 of the Pressure Equipment Safety Regulation (PESR), the Administrator in the pressure equipment discipline has established that ABSA document AB-518 “*Pressure Piping Construction Requirements*” specifies information required by the Administrator from an organization that applies for a Certificate of Authorization Permit as required under Section 11; and specifies features of a quality management system that may be acceptable to the Administrator, as provided for under Sections 12 and 13 of the PESR.

The next scheduled revision of AB-518 will be in 2027.

It is suggested that the Certificate of Authorization Permit holders download the latest revised document and update their respective quality management system documentation as necessary to ensure compliance.

It is the responsibility of a Certificate of Authorization Permit holder to be in compliance with the up-to-date requirements throughout the term of its certification. If as a result of the changes to the requirements, the written description of an organization’s QMS is revised, an updated copy of the written description of the QMS shall be submitted to ABSA.

To ensure this document remains relevant and of value to Alberta stakeholders, it shall be reviewed periodically to confirm that it is aligned with current industry best practices and policies. Additionally it shall be revised whenever an urgent need is identified. Any suggestions for improvement are welcome. Please provide comments to:

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## 1.0 SCOPE OF THIS DOCUMENT

This document outlines the Alberta requirements for the construction of new pressure piping, repair/alteration of in-service pressure piping, construction of steam pipelines in accordance with the requirements of CSA Z662 Code, construction of direct and indirect fired heater coils, and pressure piping associated with highway transportation tanks.

This document establishes the information that shall be covered in a written description of a Pressure Piping Construction Quality Management System. Implementation guidance, explanation of requirements, clarifications and recommendations are provided to assist owners and contractors meet the requirements and implement an effective management system.

Requirements include the following:

- Piping shall be designed and constructed to an adopted code;
- Design registration is required for larger systems;
- The fabricator shall have a certificate of authorization permit;
- The fabricator shall use certified welders and registered welding procedures;
- Pressure testing shall be by the hydrostatic test method;
- Pressure piping shall be examined by qualified personnel during the construction phases;
- Construction shall be certified by the fabricator and an owner's inspector.

## 2.0 DEFINITIONS and ACRONYMS

**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)]

**Access to a code** – availability for use on the same day the need for the code arises.

**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)
- Administrative Items Regulation (Alberta Regulation 16/2004)

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

**AER** – means Alberta Energy Regulator of Alberta (formerly ERCB).

**AI** – means Authorized Inspector (employed by an AIA such as ABSA).

**Alberta Quality Program (AQP)** – a quality program that covers a defined scope such as piping fabrication, vessel fabrication, etc. for which a certificate of authorization permit has been issued per PESR Section 11.

**ASME** – means American Society of Mechanical Engineers.

**Authorized Inspection Agency (AIA)** – means an Authorized Inspection Agency authorized by a regulatory authority to perform inspections required under the Act. [CSA B51-19, clause 3]

**CAP** – means Certificate of Authorization Permit issued by ABSA.

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

**CRN** – is the acronym for Canadian Registration Number and means a design registration number issued by a pressure equipment jurisdiction in Canada per the requirements of CSA B51 Code. CRNs are issued for boiler, pressure vessel or fitting designs. For use in Alberta, a boiler, pressure vessel or fitting is planned to be used in Alberta must have a CRN issued by ABSA.

Note: In addition to CRNs, there are other types of provincial design registrations in Alberta. Alberta provincial design registration numbers (not CRNs) are issued for pressure piping design registrations (PP numbers), special design registrations (ALDs), or welding procedures (WPs).

**CSA** – is the acronym for Canadian Standards Association.

**DN** – means a dimensionless designator used in the SI (metric) system to describe pipe size. [PESR, Partial Exemption 4(1)]

**Examination** – means quality control functions performed by the pressure piping fabrication contractor, fabricator or erector.

**Expansible Fluid** – means (i) a vapour or gaseous fluid, or (ii) a liquid under pressure and at a temperature at which the liquid changes to a gas or vapour when the pressure is reduced to atmospheric pressure or when the temperature is increased to ambient temperature. [PESR 1(1)(l)]

**Fitting** – means a valve, gauge, regulating or controlling device, flange, pipe fitting or any other appurtenance that is attached to, or forms part of, a boiler, pressure vessel, fired-heater pressure coil, thermal liquid heating system or pressure piping system. [PESR, 1(1)(n)]

**Inspection** – means the activities performed by an Authorized Inspector (AI) or an Owner's Inspector, to verify that all the required examinations and testing have been completed for pressure piping, and to ensure that all the documentation for material, fabrication, and examination conforms to the applicable requirements of the Code of construction and the engineering design.

**Inspector** – means an Owner's Inspector, an In-service Inspector, or an ABSA Safety Codes Officer, who is responsible for inspecting and certifying the item of pressure equipment.

**IQI** – means Image Quality Indicator (or penetrameter) as referenced in ASME Section V Code.

**ISO** – means International Organization for Standardization.

**ITP** – means an Inspection Test Plan.

**NDE** – means Nondestructive Examination conducted in accordance with the requirements of the ASME Section V Code.

**NPS** – means Nominal Pipe Size.

**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)]

**PEFL** – means Pressure Equipment Fabrication Ltd. (a name used for illustration purposes only in AB-518 sample procedure in the Appendix).

**P.Eng.** – means a professional engineer who is experienced in the design of pressure piping and is registered in any province or territory of Canada or a state of the United States of America. [PESR 1(2)]

**Permit** – means a Certificate of Authorization Permit issued by ABSA pursuant to Section 44 of the SCA.

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

**Power Plant** – means

- (i) a boiler in which steam or other vapour can be generated at a pressure exceeding 103 kilopascals or a temperature exceeding 121 degrees Celsius,
- (ii) a boiler in which liquid can be heated to a pressure exceeding 1100 kilopascals or a temperature exceeding 121 degrees Celsius, or both, or
- (iii) a system or arrangement of boilers described in subclause (i) or (ii), and the pressure vessels, pressure piping systems and fittings used in connection with one or more of the boilers; as defined in the Pressure. [PESR 1(1)(y)]

**PRD** – means a Pressure Relief Device.

**Pressure Equipment** – means a boiler, a fired-heater pressure coil, a thermal liquid heating system and other equipment designed to contain expansible fluid under pressure, including, but not limited to, pressure vessels, pressure piping systems and fittings, as defined in the regulations. [SCA 1(1)(y)]

**Pressure piping fabrication contractor** – means pressure piping system fabricator or contractor holding a valid Certificate of Authorization Permit for the pressure piping fabrication activities in Alberta.

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

**Pressure Plant** – means a pressure vessel or a system or arrangement of pressure vessels and the pressure piping system used in connection with the pressure vessel, or the system of pressure vessels or the arrangement of pressure vessels. [PESR 1(1)(bb)]

**Quality Control (QC)** – Quality Control is part of the quality management system that is focused on fulfilling quality requirements.

**Quality Management System (QMS)** – means all the documented, planned and systematic actions needed to ensure that this Act is complied with. [SCA 1(1)(aa)]

**Steam Pipelines** – means steam pipelines used in the recovery of hydrocarbons from a reservoir or oil sands deposit as defined in the Alberta Energy Regulator (AER) Directive 077, Section 3.

**WPS** – means a Welding Procedure Specification meeting the requirements of ASME Section IX Code.

Please refer to the Safety Codes Act and Regulations for other relevant definitions.



### 3.0 REQUIREMENTS

#### 3.1 Certificate of Authorization Permit Requirement:

The Pressure Equipment Safety Regulation ([PESR](#)) establishes that the Construction, Repair/Alteration of Pressure Piping systems be done by a 'Certificate of Authorization Permit' holder in Alberta. (PESR Section 11)

**Unless otherwise exempt by the Act or the Regulations (see Sec. 6.0 Exemptions), a 'Certificate of Authorization Permit is required if a person wishes to construct and/or repair/alter:**

- pressure piping in accordance with the requirements of ASME B31.1, ASME B31.3, ASME B31.5 and ASME B31.9 Codes in Alberta.
- steam pipelines (constructed to Z662 Code and in accordance with ABSA Directive IB10-006, Rev. 3, issued April 22, 2015 and AER's (previously ERCB) Directive 077, issued Dec. 22, 2011) in Alberta.
- pressure piping associated with highway transportation tanks in accordance with the requirements of CSA B620-20, Clause 8.1.3.4 (refer to Section 3.12 for details) in Alberta.
- indirect fired heater coils (constructed to ASME B31.3 Code) in Alberta.
- direct fired heaters (designed to API-530 and constructed to ASME B31.3 Code) in Alberta.

**Canadian pressure piping fabrication contractors located outside of Alberta but within Canada:**

- Pressure piping shall be constructed in accordance with the requirements of the local pressure equipment jurisdiction. An owner should contact the pressure equipment jurisdiction of the province where the pressure piping may be constructed to determine the local jurisdictional requirements (e.g. inspection, certification requirements) before signing a contract. Generally, most provinces require that a pressure piping contractor obtain a Certificate of Authorization from the local pressure equipment jurisdiction per the requirements of CSA B51 Code. Some provincial jurisdictions also inspect the pressure piping during construction.

The pressure piping construction shall be documented by the contractor using a data report form that is acceptable to the Administrator. The following describes the acceptable use of forms, and the certification requirements:

- If the piping contractor holds a valid Certificate of Authorization issued by the local pressure equipment jurisdictional authority:

If the local jurisdictional rules permit the piping contractor to construct the piping without inspection by a local jurisdictional inspector, use ABSA form AB-83 (or equivalent) to document construction. The form shall be certified by contractor and an owner's inspector and submitted to the owner.

If the local jurisdictional rules do not permit construction without inspection by a jurisdictional inspector, use ABSA form AB-83F (or equivalent) to document construction. The form shall be certified by the contractor and an AI employed by the local jurisdiction. The form shall be submitted to the owner.

- If the piping contractor does not hold a valid certificate of authorization issued by the jurisdictional authority:

Use ABSA form AB-83F. The form shall be certified by the contractor and a National Board commissioned new construction jurisdictional inspector with an Authorized Inspector (AI) Commission and submitted to the owner.

**Note:** ASME B31.1 Boiler External Piping requires inspection and certification by an Authorized Inspector.

- Organizations which are authorized to construct piping in other provinces and wish to set up fabrication facilities in Alberta for the construction of pressure piping are required to obtain a Certificate of Authorization Permit and register their WPSs with ABSA prior to the start of work. Please review Section 4.0 Certification Process for more information.

#### **Pressure piping fabrication contractors located outside of Canada:**

- Pressure piping that is constructed outside of Canada shall be inspected and certified by an Authorized Inspector (A.I.) employed by an A.I.A. acceptable to ABSA. The inspection and certification shall be documented using an ABSA AB-83F form. A certified AB-83F form shall be submitted to the owner.
- Organizations who wish to set up fabrication facilities in Alberta for the construction of pressure piping are required to obtain a Certificate of Authorization Permit and register their WPSs with ABSA. Please review Section 4.0 Certification Process for more information.

### 3.2 Overview of the Act, Regulations, Codes and Standards, and, Requirements for maintaining copies thereof:

- [Safety Codes Act](#), Revised Statutes of Alberta 2000, Chapter S-1:

The paramount document in the hierarchy of the requirements is the Safety Codes Act. The Act establishes requirements such as responsibilities of the owners, pressure piping fabrication contractors, contractors, designers; powers of the Safety Codes Officers; issuance and suspension of permits; maintenance of a QMS. Orders, appeals and penalties are also described in the Act. SCA defines pressure equipment. Fittings such as PRDs are part of this definition.

**Compliance with the SCA is mandatory. Organizations who construct pressure piping are required to maintain access to a current copy of the Act.**

- [Pressure Equipment Safety Regulation \(PESR\)](#), Alberta Regulation 49/2006:

The PESR is enacted under the Safety Codes Act and establishes requirements for the design and construction of pressure piping systems in Alberta. It defines the 'pressure piping system' as *"pipes, tubes, conduits, fittings, gaskets, bolting and other components that make up a system for the conveyance of an expansible fluid under pressure and may also control the flow of that fluid"*. A pressure piping system in which a process change happens does not meet the requirements of this definition. Such a piping system may be categorized as a pressure vessel or a fitting (e.g. direct fired heaters, indirect heater coils, 'J' tube for testing PRVs).

Some of the key requirements of the PESR related to the pressure piping are listed below:

- Pressure piping shall be constructed in accordance with the requirements of one of the listed ASME B31 Codes (Section 6 of the PESR);
- Certificate of Authorization Permit is required to construct and/or repair/alter pressure piping in Alberta (Section 11 of the PESR);
- A pressure piping system's design shall be registered (if required) with ABSA (Section 14 of the PESR);
- Welding, brazing and bonding procedures shall be registered with ABSA (Section 18 of the PESR);
- A completed pressure piping system shall be hydro tested (Section 30 of the PESR);
- A completed pressure piping systems shall be certified by the contractor using an AB-83 form (Section 31 of the PESR);
- Before the initial operation of any pressure piping system that requires registration of its design, the person responsible for its construction must provide the Administrator with a completion of construction declaration using an AB-81 form (Section 32 of the PESR);

**Organizations who construct pressure piping are required to maintain access to a current copy of the PESR.**

- **[Pressure Welders Regulation](#), Alberta Regulation 169/2002:**

Pressure Welders Regulation establishes requirements for the **Certificate of Competency** and **Performance Qualification Cards** for welders, machine welding operators and pressure tack welders.

The above requirement refers to the use of certified 'B' or 'C' Pressure Welders, Machine Welding Operators and Pressure Tack Welders for the fabrication of pressure piping systems. A 'B' pressure or 'C' pressure welder is not permitted to weld on any pressure equipment unless he/she is employed or contracted by a Certificate of Authorization Permit holder and is knowledgeable about the permit holder's WPSs and the QMS's requirements. Other requirements include assignment of a weld symbol to the welder or operator; identification of the welds using the assigned symbol and maintenance of the records of the welders/operators. If your activity requires welding, **compliance with the Pressure Welders Regulation is mandatory and you are required to maintain access to a current copy of the Regulation.**

- **[Pressure Equipment Exemption Order](#), Alberta Regulation 56/2006:**

The Pressure Equipment Exemption Order establishes exemptions for pressure piping such as pressure piping which is fully vented to atmosphere or operating with one or more PRDs with set pressure not exceeding 103 kPa; or piping that forms part of a heating plant. **You should be aware of what is exempt.**

**The following codes and standards include requirements for pressure piping and have been adopted through the PESR (Sec. 6 of PESR). Compliance with the requirements of the adopted codes is mandatory:**

- **Boiler, Pressure Vessel and Pressure Piping Code, CSA B51:**

CSA B51 Code establishes requirements for the construction of pressure piping and fittings in Canada. The code has been adopted by all pressure equipment jurisdictions in Canada and therefore compliance with it is mandatory throughout Canada (the application of the requirements may vary). Information regarding the Canadian Registration Number (CRN); categories of Fittings viz. A, B, C, D, E, F, G and H; pressure testing; and fired heaters is included in this code. Organizations importing/exporting or operating in various Canadian provinces shall meet the requirements of CSA B51 Code and the requirements of the local authority having jurisdiction where the pressure piping systems are either constructed or installed. Under Section 2(2) of PESR, if there is a conflict between the provisions of the CSA B51 Code and other adopted codes or standards, the provisions of the CSA B51 Code shall prevail over the other codes or standards. **A Certification of Authorization Permit (CAP) holder shall have access to a current copy of this Code.**

- **Mechanical Refrigeration Code, CSA B52:**

CSA B52 Code establishes requirements for the construction of mechanical refrigeration systems including refrigeration piping and tubing in Canada. If you are seeking a Certificate of Authorization Permit for the construction of mechanical refrigeration piping and/or tubing, **compliance with the CSA B52 Code is mandatory and you are required to maintain access to a current copy of this Code.**

- **Oil and Gas Pipeline Systems, CSA Z662:**

CSA Z662 Code establishes requirements for the construction of oil and gas industry pipeline systems in Canada. These pipelines are typically exempt from the Safety Codes Act, however, the Alberta Energy Regulator (AER) Directive 077 has been established with respect to Steam Pipelines. If you are seeking a Certificate of Authorization Permit for the construction of steam pipelines,

compliance with the CSA Z662 Code is mandatory and you are required to maintain access to a current copy of this Code.

- **Process Piping Construction per ASME B31.3 Code:**

ASME B31.3 Code is typically used for the design and construction of pressure piping found in Petroleum Refineries, Chemical, Pharmaceutical, Textile, Paper, Semiconductor, and Cryogenic Plants and related Processing Plants and Terminals. This code has been adopted through PESR in Alberta and therefore is mandatory. If you are seeking a Certificate of Authorization Permit for the construction of ASME B31.3 process piping, **you are required to maintain a current copy of this Code.**

- **Power Piping Construction per ASME B31.1 Code:**

ASME B31.1 Code is typically used for the design and construction of power piping found in Electric Power Generating Stations, Industrial and Institutional Plants, Geothermal Heating Systems, and Central & District Heating and Cooling Systems. This code has been adopted through PESR in Alberta, therefore is mandatory. If you are seeking a Certificate of Authorization Permit for the construction of ASME B31.1 power piping, **you are required to maintain a current copy of this Code.**

- **Refrigeration Piping Construction per ASME B31.5 Code:**

ASME B31.5 Code is typically used for the design and construction of pressure piping containing refrigerants or secondary coolants (used in conjunction with CSA B52 Code). This code has been adopted through PESR in Alberta, therefore is mandatory. If you are seeking a Certificate of Authorization Permit for the construction of ASME B31.5 refrigeration piping, **you are required to maintain a current copy of this Code.**

- **Building Services Piping Construction per ASME B31.9 Code:**

ASME B31.9 Code is typically used for the design and construction of piping found in Industrial, Institutional, Commercial, Public Buildings and multi-unit residences which do not require the range of sizes, pressures and temperatures covered by ASME B31.1 Power Piping Code. This code has been adopted through PESR in Alberta, therefore is mandatory. If you are seeking a Certificate of Authorization Permit for the construction of ASME B31.9 piping, **you are required to maintain a current copy of this Code.**

- **Welding and Brazing Qualifications, ASME Section IX Code:**

ASME Section IX Code is referenced in the ASME Codes of construction such as ASME B31.3, ASME B31.1, ASME B31.5, ASME B31.9 and includes information about the requirements for welding/brazing procedures and welders/operators qualifications. A WPS shall meet the requirements of this code as a pre-condition of registration with ABSA. Important information about the Welders/Operators Performance Qualification testing is included in this code. If you intend to assemble pressure piping by welding/brazing, **compliance with the applicable sections of the ASME Section IX Code is mandatory and you are required to have an access to a current copy of this Code.**

Welding being a critical activity for the construction of pressure piping, and, given that the frequent consultation that is generally sought at workplaces to ensure compliance with the ASME code of construction and this code, it is recommended that the Code be purchased by the pressure piping fabrication contractor.

If an organization is engaged in the mechanical assembly of pressure piping only, ASME Section IX Code does not apply.

- **Nondestructive Examination (NDE), ASME Section V Code:**

ASME Section V Code is referenced in the ASME Codes of construction such as ASME B31.3, ASME B31.1, ASME B31.5, ASME B31.9 and includes information about NDE. NDE requirements and techniques such as radiography, MPI, UT, and visual examination are specified in the ASME B31 Codes. If you intend to assemble pressure piping by welding/brazing, **compliance with the ASME Section V Code is mandatory and you are required to have access to a current copy of this Code.**

**Note:** Electronic access in lieu of maintaining hard copies is acceptable provided the provision is described in your document control process.

### 3.3 Quality Management System (QMS) Requirements

**Requirements that are enclosed in a box are mandatory and shall be addressed in a QMS.**

Implementation guidance is provided where appropriate to supplement or promote understanding of the requirements. **‘Implementation guidance’ is not a mandatory part of this document.**

#### **Requirements**

Management shall develop and implement a QMS that states the organization’s commitment to quality and describes the system used by the organization for the construction of pressure piping. A written description of the QMS shall meet the requirements of the AB-518 document.

#### **Implementation Guidance**

A QMS establishes an organization’s policies, business practices, commitment, and accountability to meet the specified requirements, and describes a system to continually improve and maintain an effective management system. A written description of the QMS documents an organization’s business practices and is developed by the executive management.

A written description of the QMS may be developed in a manner that best suits an organization’s business needs provided all of the requirements of this document are addressed. It is not the intent that an organization’s QMS be formatted to adopt the same format and/or sequence or titles as that of section 3.3 of the AB-518 requirement document but rather that the requirements be addressed somewhere in an organization’s management system.

ISO 10013:2001 – Guidelines for Quality Management System Documentation, and ISO 10005:2005 – Guidelines for Quality Plans, provide useful information for developing an effective quality management system documentation. A written description of the QMS developed in accordance with the guidelines of ISO 10013:2001 and meeting the requirements of ISO 29001:2010 or ISO 9001:2015 Standards provides for the application of additional quality principals not covered by AB-518 document and thus are a sounder basis for the development of a written description of the QMS. A QMS based upon ISO 29001:2010 or ISO 9001:2015 Standards is recommended (no registration is required with an ISO registrar) and will be acceptable provided all of the requirements of this document are addressed.



A written description of the QMS should accurately describe the system in practice. It should be a working document and enable the management, service personnel, auditors, ABSA, customers and other interested parties understand the manufacturing, assembling, repairing or servicing processes.

The extent of documentation needed to meet the requirements of this document will depend upon the size of the organization, type, location and complexity of the operations and competence of the personnel. Smaller organizations may find it appropriate to provide detailed descriptions of their work processes within the written description of the QMS documentation. However, as a general rule, including detailed procedures within the main body of the written description of the QMS documentation distracts a user from the key requirements of the management system. For this reason, procedures and other supporting documents that detail the processes may be referred to in the written description of the QMS and maintained separately as controlled documents. The content of the QMS elements should be limited to a brief explanation of the key requirements.

Samples of a QMS Element and a Procedure are included for information in Appendix A and B respectively.

The primary purpose of procedures, engineering standards, manufacturing standards, work instructions and other such documents is to provide detailed guidance to the individuals involved in the construction of pressure piping systems. These documents shall, therefore, be readily available at the point of use. They should be written with the reader in mind to clearly convey what is required to perform the activities, and, shall be detailed enough so that activities could be completed to meet the quality requirements consistently. The guidance documents may take the form of flow charts, tables, text, a combination of these or other means which may best suit the organization.

The senior management responsible for the construction and/or repair/alterations of the pressure piping systems should be actively involved in the development and implementation of the QMS. This is necessary to ensure that the QMS reflects current business practices, is effective, adds value to the organization's business and ensures that activities are aligned, effectively interlinked to the supporting systems and also demonstrates compliance to the legislation.

Owners of pressure equipment who have a pressure equipment integrity management program registered with ABSA and are also certified to construct pressure piping systems, shall also meet the requirements of the AB-518 document.

### 3.3.1 Scope

#### **Requirements**

The organization shall:

- describe the scope of the activities to be undertaken;
- list the shop locations;
- describe the scope of work undertaken at each shop location, and the address of each shop;
- indicate whether activities are undertaken at shop and/or at field sites;
- state the title of a person designated to perform QC function at each site, and, the title of a person who is overall responsible for maintenance and for assuring effective implementation of the QMS at all locations.

If an organization does not have a shop, and undertakes field activities only, the organization shall indicate that the activities undertaken are at field sites in Alberta controlled from an office address of the organization.

#### **Implementation Guidance**

The scope section may include exclusions for circumstances where the scope of activities may require clarification to dispel any pre-assumptions made by the clients (e.g. if a organization constructs ASME B31.1 Non-Boiler External piping only, then a statement indicating that the organization does not construct ASME B31.1 Boiler External piping, may be included).

### 3.3.2 Definitions of Terms and Acronyms

#### **Implementation Guidance**

All terms and acronyms used in the written description of the QMS should be defined.

### 3.3.3 Organization

#### **Requirements**

The management system shall:

- include a statement that the management will ensure that responsibilities and authorities are defined and are communicated within the organization; and
- describe the organizational structure and identify key positions of personnel who manage and perform work affecting quality.

#### **Implementation Guidance**

The responsibility, authority and interrelation of personnel who manage, perform and verify work affecting quality – as well as those who need the organizational freedom and authority to identify non conformances, recommend solutions, initiate corrective action and verify implementation of solutions – should be described in this section. The description may be in the form of organization charts, flow charts, and job descriptions, as applicable. These documents may be included or referenced to in the written description of the QMS.

Personnel responsible for quality control functions may report directly to a production manager, however they should have the freedom to report matters that may jeopardize safety to the top manager.

### 3.3.4 Statement of Authority and Responsibility

#### **Requirements**

A Statement of Authority document shall include:

- a statement that the written description of the QMS meets the requirements of this document and accurately describes the pressure piping construction processes implemented by the organization;
- a statement that the management will uphold the requirements of the SCA and Regulations and resolve any issues regarding quality;
- a statement that the quality system has the full support of the management who will ensure that adequate resources, including competent personnel, are provided to implement the program;
- the title of the person responsible for the development and maintenance of the pressure piping construction program, with an explanation that this person has the defined authority and responsibility for implementation of the program and has direct access to, and support from, top management to resolve any implementation barriers; and
- the signature (with date) of the senior management.

A new Statement of Authority document signed by the executive manager with the current date is required at the time of renewal of the certification.

#### **Implementation Guidance**

A Statement of Authority is required to affirm commitment and support from the top management to assure that the requirements of the Safety Codes Act will be upheld and that adequate resources will be provided for effective implementation of the quality management system.

### 3.3.5 Management's Responsibilities

#### **Requirements**

A management system's documentation shall include statements that the management:

- is committed to the development and implementation of a successful pressure piping construction and/or repair/alteration program and that it will continually improve its effectiveness;
- will review the quality management system at appropriate intervals to ensure its continued suitability and effectiveness, and that records of such reviews will be maintained.
- ;
- will determine and provide adequate and competent resources, necessary facilities and equipment to effectively implement the pressure piping construction activities;
- will appoint a member of the organization's management who, irrespective of other responsibilities, shall have responsibility and authority to ensure that QMS processes are established, implemented and maintained, and shall report performance of the QMS to the top management on a periodic basis;
- will ensure that the responsibilities and authorities are defined and communicated within the organization;
- will resolve disagreements concerning the implementation of the QMS;
- will ensure that the QMS remains in compliance with the requirements of this document, SCA, Regulations and applicable codes throughout the term of the certification.

#### **Implementation Guidance**

The objective of describing management responsibilities in the written description of a QMS is to ensure that top management makes commitment and takes a leading role in defining, implementing, administering and improving the systems with the goal of meeting the requirements established by the customers, regulations, codes & standards and organization's own standards.

Leadership, commitment and the active involvement of the top management is essential for developing, maintaining and implementing an effective and efficient quality management system.

### 3.3.6 Contract Review

#### **Requirements**

The management system shall ensure that the:

- responsibilities for a contract review are defined;
- pressure piping construction requirements, Code edition and the scope of work are documented;
- responsibilities for the supply of materials and construction drawings are identified;
- responsibility for the design and design registration with ABSA are identified;
- responsibility for PWHT and pressure testing are identified;
- the piping lot sizes for the purpose of NDE are agreed upon between the contracting parties before the start of work;
- requirement of a turnover package and contents thereof are agreed upon;
- responsibility for certification of construction using AB-83 or AB-83 Partial or AB-83F is agreed upon between the contracting parties; and
- responsibility for certifying the installation and readiness for operation using an AB-81 form is defined.

#### **Implementation Guidance**

Contract agreement is a critical activity that happens at the initial stages of the construction project and has influence upon the success of the project. The objective of describing the Contract Review process in the written description of the QMS is to ensure that contract requirements are defined, understood, agreed upon and documented prior to the start of work, and to make certain that you will be able to meet the overall requirements before accepting the order.

The written description of the QMS should provide adequate guidance to the personnel of the organization to ensure that:

- the requirements are adequately defined and documented. When an order is received by verbal means, the pressure piping fabrication contractor should ensure that the order requirements are agreed upon, documented and accepted by the owner and the pressure piping fabrication contractor prior to the start of work. The process for accepting and documenting the verbal orders should be addressed in the written description of the QMS and detailed in the procedures;

- any differences between the tender and the actual contract are resolved;
- the pressure piping fabrication contractor has the capability to meet the contract requirements;
- the process for the amendment of the contract is defined and includes transfer of information to the concerned functions;
- lines of communication between the client and the pressure piping fabrication contractor are defined;
- the authority of both parties is defined.

### 3.3.7 Document & Data Control

#### Requirements

The document control system shall identify the documents that will be controlled, maintained to remain relevant and current under the responsibility of a designated person. The management shall ensure that:

- the controls needed for the development, identification, storage, revision, protection, retrieval, retention time, and disposition of records are addressed;
- a document revision control process is implemented, amendments to the documents are authorized by the Certificate of Authorization Permit holder and processed in a manner to ensure timely availability of the documents at the appropriate location;
- no changes are permitted to the QMS documentation that may render a document to be in non compliance with the requirements of the AB-518 document, SCA, Regulations and applicable codes and standards throughout the certification period;
- a current version of the written description of the QMS is provided and accepted by ABSA;
- all changes to the documents are managed appropriately, including notification to the affected parties;
- the current issues of the appropriate documentation are available at all relevant locations and to all relevant parties;
- the superseded documents are removed from use throughout the organization or are appropriately identified as superseded documents;
- the current revision status of documents is identified;
- documents will remain legible, readily identifiable and retrievable; and
- documents of external origin are identified and their distribution controlled.

## **Implementation Guidance**

**A written description of the QMS:** A written description of the QMS should provide information about the management system that is currently in practice and meets the requirements of AB-518 document. Description of the processes, references to documented procedures and the interactions thereof should be included in the written description of the QMS. A written description of the QMS may be developed to follow the sequence of an operation or the structure of a standard (e.g. ISO 9001) or in any other format considered suitable by the organization.

**Revision Control:** Provided the compliance to the AB-518 document, SCA, Regulations, applicable codes and standards is maintained throughout the certification period, revisions to the QMS documentation can be made by a Certificate of Authorization Permit holder without seeking acceptance by ABSA.

Some but not all documents that may be controlled are:

- A written description of the QMS for the construction of pressure piping;
- SCA, Regulations, ASME Codes and Standards;
- Project file;
- Contract Review documents;
- Piping Design calculations;
- Design registration documentation;
- Piping construction drawings;
- Piping specification documents;
- Material purchase documents;
- Material receiving verification documents;
- Material Test Reports (MTRs) when requested by the owner;
- Canadian Registration Number (CRN) documentation for Fittings;
- Fabrication documents such as construction Inspection Test Plan (ITP), Travel Sheet and other documents used for fabrication and considered significant by the pressure piping fabrication contractor;
- WPSs, Procedure Qualification Records;
- Welder's records;
- PWHT documentation;
- Impact testing documentation;
- NDE reports;
- Radiographic film;
- Hydro test report;
- Equipment calibration records;
- Training records;
- Audit reports;
- Management review report of the QMS;
- Corrective Action and Preventive Action records;



- System performance feedback records;
- 'Turn Over' package contents;
- Quality System Forms;
- Any other piping fabrication quality documents deemed necessary by the pressure piping fabrication contractor.

Records may be maintained in hard copy or electronic format. Electronic systems should be protected from unauthorized alteration. Electronic online document control systems provide for an excellent method of displaying, controlling documents and for identifying and directing the reader to the documents that contain detailed requirements, provided the system is secure and readily available at the point of use. For issuance and distribution of documents, including documents issued in electronic format, the system used to control the documents should be described in the written description of the QMS.

**For owners of pressure equipment:** It is recommended that records related to the construction of pressure piping be retained for the life of the equipment.

### 3.3.8 Piping Design

Whether a piping system design is undertaken in-house, contracted out, or is supplied to you by an owner; the design control process shall be described in the written description of your QMS.

Requirements for 3 possible scenarios are specified below. Determine the scenario(s) that apply to your situation and address that/those scenario(s) in the written description of your QMS.

#### **Requirements**

##### **Scenario 1**

**A pressure piping design is undertaken by:**

- **a pressure piping fabricator, or,**
- **an owner-user who fabricates piping for his/her own use.**

**A fabricator or an owner-user shall ensure that:**

- the design requirements such as the operating conditions, service requirements and other information needed to facilitate the safe design, construction, and inspection of the pressure piping system are identified and documented;
- the personnel assigned to engineer the piping systems are deemed competent and meet the qualification standards of the owner, and of the applicable ASME B31 Code(s);
- design documents are stamped by a P.Eng when a pressure piping system is required to be registered with ABSA;
- piping design documents are prepared, verified and approved by the designated personnel of the owner;
- the design documents provide information about the code of construction including edition, proper material specifications, design pressure, maximum and minimum design temperatures, ASME B31.3 fluid category for process piping, type and extent of NDE required, hydro test pressure and medium, Pre Heat and PWHT treatment requirements, joint design details, WPS and dimensions;
- the design code edition and addenda of the applicable ASME code of construction, standards and other related documents are available to design personnel;
- the latest approved design documents are made available at the point of use;
- an appropriate management of change process is utilized to manage changes to the designs;
- if the aggregate internal volume of a piping system exceeds 500 liters, the design registration requirements with ABSA are specified; and
- the drawings are reviewed and approved by the personnel responsible for engineering prior to release for construction.

## Requirements

### Scenario 2

**Pressure piping design is completed by an owner-user or contracted out to a designer by an owner-user.**

**The owner shall ensure that:**

- competent in-house engineering resources are assigned to prepare a design basis memorandum (DBM) that identifies the design and operating conditions, the service requirements and other information needed to facilitate a safe design, construction, and inspection of the pressure piping system;
- when no in-house engineering resources are available, a process for contracting out the preparation of the DBM is described;
- the DBM is reviewed, approved and provided to the designer by the owner prior to the start of the design activity;
- the designer is competent and meets the qualification requirements of the owner and of the applicable ASME B31 Code(s) of construction;
- the current ASME Codes are made available to the designer by the contract engineering organization;
- the design documents prepared by the designer provide information about the Code of construction including edition, proper material specifications, design pressure, maximum and minimum design temperatures, ASME B31.3 fluid category for process piping, type and extent of NDE required, hydro test pressure and medium, preheat and PWHT treatment requirements, joint design details, WPS and dimensions;
- the owner's responsibilities for the verification and acceptance of the design documents are prescribed;
- if the piping system's internal volume exceeds 500 liters, responsibility for the registration of the design with ABSA is assigned; and
- the drawings are reviewed and approved by the owner prior to release for construction.

## **Requirements**

### **Scenario 3**

**Pressure piping design is supplied to a pressure piping contractor by an owner-user.**

**The pressure piping contractor shall ensure that:**

- the construction drawings and/or other engineering documents received from an owner provide information about the code of construction including edition, proper material specifications, design pressure, maximum and minimum design temperatures, ASME B31.3 fluid category for process piping, type and extent of NDE required, hydro test pressure and medium, preheat and PWHT treatment requirements, joint design details, WPSs and dimensions unless the listed information is provided through other appropriate documentation by the owner;
- when the spool drawings or cut sheets are prepared by a pressure piping contractor, the drawings or cut sheets are controlled and linked to the owner supplied construction or design drawings; and
- the drawings are reviewed and approved for construction by the pressure piping contractor prior to release for construction.

## **Implementation Guidance**

This section should describe the system for ensuring that piping systems are designed in accordance with the requirements of the owner and Regulations, and that the design addresses the service conditions and other process related requirements. Pressure piping fabrication contractors should establish and maintain documented procedures for piping design control and coordination of those activities.

The term DBM refers to a document prepared by the owner to identify the design and operating parameters, fluid service and any other information needed to ensure that a piping design is realized by a designer, meets the overall requirements and will be safe for the intended service. For small upstream projects, this may simply be comprised of well fluid analysis, shut-in well pressures, design pressures and temperatures and other basic information provided by facility personnel. For major projects, the DBM may be comprised of several detailed documents.

ABSA's design review and registration is based upon the information that is provided by a registrant. ABSA's design review is limited to the

verification that the design meets the Act and minimum requirements of the Code of construction.

Registering the design with ABSA does not relieve a registrant, the designer, pressure piping fabrication contractor, owner and other relevant parties, from the responsibility for ensuring that the design is suitable for the service, meets the requirements of the owner, the Act and that it will be safe for operations.

For Owner-Users, pressure piping and components that are replaced, modified or added to an existing registered pressure piping system in conformance to the original registered pressure piping design specifications are not considered to be alterations, and the design information does not require submission to ABSA Design Survey for review and registration. Any such replacements, modifications and additions must be approved by the Owner-User's Professional Engineer. This is intended to be used for maintenance activities, and does not apply to new plants.

### 3.3.9 Purchasing and Material Control

A pressure piping fabrication contractor should establish and maintain documented procedures for material control activities such as purchasing, receiving and storage to ensure that the materials are purchased as specified in the engineering design, are defect free on receipt, preserved and remain identifiable.

#### Requirements

- **Purchasing:** A pressure piping fabrication contractor shall:
  - specify purchasing responsibilities;
  - specify the process for purchasing the materials and ensure conformance to the material requirements of the engineering design and requirements of the owner;
  - ensure that the fittings ordered are registered with ABSA (have valid CRN for installation in Alberta);
  - specify the process for controlling purchase documents.
- **Control of Owner supplied materials:** The pressure piping fabrication contractor shall establish a process for verification, storage and maintenance of owner supplied materials.
- **Receiving of materials:** The pressure piping fabrication contractor shall ensure that:
  - received materials conform to the correct specifications and

- quantity, and are not damaged;
- a process is established for identifying and disposing of non-conforming items.

- **Materials Identification and Traceability:**

The pressure piping fabrication contractor shall establish a process for identification of pipes, fittings, bolting, welding consumables and other materials used for piping fabrication while in storage and during the construction phases.

### **Implementation Guidance**

#### **Purchasing:**

The pressure piping fabrication contractor should ensure that purchased materials conform to the requirements of the engineering design. A documented procedure for the purchase of materials and/or services should:

- Address the process used for selecting suppliers based on their ability to supply materials, and services.
- address the requirements for a Certificate of Authorization Permit when subletting pressure piping construction work to another piping fabrication contractors;
- implement a process for generating purchase orders (P.O.);
- specify requirement for proper specification of ASME material such as type, class, grade of materials and the schedule (e.g. SA106 Gr. B, Sch. 80) and Welding consumable's SFA specification and AWS classification;
- specify requirement for MTRs when requested by the owner;
 

**Note:** In most cases MTRs are not required for material acceptance in accordance with ASME B31 Codes or by ABSA. When specified by an owner, MTRs may be supplied by a pressure piping fabrication contractor.
- specify requirement that fittings used for the construction of the pressure piping systems are registered with ABSA (for Alberta installations only);
- specify requirement for verification and approval of P.O.s when necessary;
- specify a process for the substitution of materials;
- specify a process for verbally ordering the materials. The process should ensure that a supplier is provided with the correct material specifications and other required ordering information when ordering materials on phone. A verbal order should follow up with the supply of a documented order to a supplier.

Control of Owner supplied materials:

The pressure piping fabrication contractor should establish and maintain documented procedures for the receipt and inspection of materials, verification of documents, storage and maintenance of owner supplied materials such as piping, fittings and other equipment that may form part of a piping system. The pressure piping fabrication contractor is fully responsible for assuring that materials supplied by the owner meet the requirements of the engineering design and that they are received at the fabricator's facilities in good shape.

### Receiving of materials:

The pressure piping fabrication contractor should ensure that the materials received on site meet specified purchasing requirements, the requirements of the engineering design, the applicable codes and specifications. The material receivers should be trained to the receiving procedures. The control features should include a process for:

- ensuring that the received materials conform to the correct specifications, quantity, dimensions and that they are not damaged. Availability of a copy of the P.O. to a receiver will help to cross check the Packing Slip and inspect materials to ensure conformance to the requirements of the P.O.;
- ensuring that documentation requested (such as MTRs, CRN documents) is received or is otherwise is available from other sources such as a supplier's web site;
- verifying MTRs (when requested by the owner) and CRN documentation. The extent of verification of the MTRs should be specified;
- identifying, segregation and disposing off of non-conforming items;
- ensuring that the materials issued for the construction comply with the specifications of the engineering design;
- the inspection and verification of partial or completed piping packages received from other qualified vendors. All completed packages from within Alberta should be accompanied by final AB-83 forms and partial packages by partial AB-83 forms.

### Materials Identification and Traceability:

The pressure piping fabrication contractor should establish and maintain documented procedures for identifying pipes (such as SA 106, Gr. B, SA 333, Gr. 6 etc.), fittings, bolting, welding consumables and other materials used for the fabrication of piping systems.

The pressure piping fabrication contractor may use unique colour coding, heat number, bar code or any other method to maintain traceability of materials. The method(s) used should be documented and personnel trained as necessary. Color code charts should be displayed in the shop, warehouse and receiving areas for easy consultation by the personnel.

The pressure piping fabrication contractor should ensure that the materials remain identifiable until a piping system is inspected by an owner's inspector or until the inspector indicates that maintenance of identification of certain components is no longer required. If any piece is cut from an existing identifiable pipe, the process should ensure that the remaining piece of the pipe remains identifiable.



### 3.3.10 Construction of Pressure Piping

A pressure piping fabricator shall establish methods to ensure that the pressure piping systems are constructed and installed in accordance with the requirements of the engineering design, the Act and an applicable ASME Code of construction.

#### Requirements

A pressure piping fabrication contractor shall ensure that:

- a fabrication plan is developed and reviewed with the personnel;
- an ITP (and/or a Construction Travel Sheet) and a project file are initiated prior to the start of the project and maintained;
- the owner's inspector is assigned by an owner and that he/she is informed prior to the start of construction to review construction plans and confirm owner's requirements;
- up to date and approved (by the QC Manager) drawing(s) is/are available for the construction;
- when no design drawings or spool drawings are supplied by an owner and the spool drawings are prepared by the contractor, documented approval shall be obtained from the owner to confirm that the design, material, fabrication, NDE, PWHT, hydrotest and any other information specified in the documents is accurate;
- the materials are available, issued for construction and checked for conformance with the engineering design prior to the start of fabrication;
- welding and other fabrication activities are monitored and documented during production;
- the WPS and dimensions specified in the engineering design are suitable for the job;
- when no WPS and dimensions are specified by the designer, the process for assigning the WPS and dimensions in coordination with the owner's inspector is specified;
- copies of the registered WPS are available to the welders, reviewed with them and implemented effectively;
- the welders are qualified for the job and records of the welders qualification are maintained, including evidence the welder has maintained qualification (i.e. continuity records) as applicable;
- inspection and examination stages are identified, carried out in accordance with the acceptance criteria established by the design documents, documented, verified and records maintained;
- the process for defining the extent of NDE, identification of spools, supply of NDE instructions to the NDE organizations, review of radiographs and reports and acceptance are defined and documentation maintained;
- for ASME B31.1 Boiler External piping, ABSA's inspection and certification are specified;
- PWHT is completed in accordance with requirements of the engineering design, verified and documented;

- pressure testing is accomplished in accordance with requirements of the engineering design and codes, and documented;
- the completed job is certified using an AB-83 Form, a copy is supplied to the owner and records maintained;
- when a job partially meets requirements of the SCA, Regulations and applicable ASME B31 code(s), a partial AB-83 Form is completed and provided to the primary contractor;
- when the piping system was originally registered with ABSA, unless specified otherwise by the contract, an AB-81 form is completed prior to the operation and submitted to ABSA.

### **Implementation Guidance**

This section should describe the system for ensuring that piping systems are constructed in accordance with the requirements of the engineering design, the owner's specifications, the pressure piping fabrication contractor and the Regulations. Responsibilities for implementation of the piping construction activities should be defined and understanding confirmed.

A pressure piping fabrication contractor shall hold a valid Certificate of Authorization Permit for the scope of work.

ABSA's construction inspection activities are generally limited to Code inspection of boilers, pressure vessels, thermal fluid heaters, direct and indirect fired heaters, and boiler external piping (ASME B31.1). Normally no inspections are carried out by ABSA SCO for the construction of pressure piping (except for boiler external piping), nor does it conduct detailed verifications of the location and orientation of nozzles, fittings, internals or the adequacy of coatings and paint, and the requirements of the engineering design that may exceed the code requirements.

The Owner must determine who the responsible party will be for completing and submitting the respective AB-81, the complexity of the design must be considered when selecting the responsible party.

### 3.3.11 Post Weld Heat Treatment (PWHT)

#### Requirements

To ensure that the PWHT process is controlled and completed in accordance with requirements of the engineering design, the pressure piping fabrication contractor shall:

- assign responsibilities for the implementation and maintenance of the PWHT procedures;
- verify whether the PWHT requirements are defined in the engineering design/drawings or otherwise made available by the owner;
- ensure that the PWHT activities are executed in accordance with the requirements of the engineering design;
- ensure that the piping spools designated for PWHT are identified;
- ensure that the PWHT instructions for the piping are prepared and supplied to the heat treatment contractor;
- ensure that upon completion of the PWHT of the piping, it is inspected for damage and to confirm identification, and the documentation received from a PWHT organization is verified;
- maintain PWHT documentation.

#### Implementation Guidance

The pressure piping fabrication contractor should establish and maintain documented procedures for PWHT and the coordination of those activities. This section should describe the system for ensuring that piping systems are post weld heat treated in accordance with requirements of the engineering design. An engineering design should meet the requirements of an applicable ASME B31 Code of construction.

**PWHT subcontractors are not certified by ABSA. Pressure piping fabrication contractors or owners who employ PWHT subcontractors should ensure that the PWHT subcontractors perform to the documented PWHT procedures, that the procedures meet the requirements of applicable code(s) of construction (such as ASME B31.3, 31.1.....codes), employ trained and competent technicians, use calibrated equipment and preferably work under a QMS to assure consistency, quality and conformance to the requirements.**

### 3.3.12 Nondestructive Examinations and Testing

NDE such as RT, UT, and MT may be required by the ASME B31 Codes. The process for controlling the NDE activities, defining responsibilities and qualifications of personnel, verification and certification of the reports, and radiographs shall be described in the written description of a QMS for assuring consistent application of the procedures.

#### Requirements

The pressure piping fabrication contractor shall ensure that:

- NDE required for the pressure piping fabrication is determined from the design documents provided by the owner;
- piping lot sizes are established in agreement with the owner;
- procedures used for performing NDE are documented and meet requirements of the current Regulations, ASME Section V and the applicable ASME B31 Code of construction;
- the NDE interpretations are performed by SNT-TC-IA Level II or III technicians;
- written instructions for performing NDE are provided to the NDE organization performing NDE;
- the process for identifying the welding joints requiring NDE is documented;
- NDE is performed to achieve the specified amount of NDE for each lot;
- radiographic film and reports are reviewed and accepted by the pressure piping fabrication contractor; and
- NDE documents are kept on file for a specified period of time.

#### Implementation Guidance

The pressure piping fabrication contractor should establish and maintain documented procedures for the NDE and coordination of those activities. This section should describe the system for ensuring that the NDE procedures meet the requirements of an organization, Regulations, the engineering design, ASME Section V Code, the Code of construction (such as ASME B31.3, ASME B31.1), and that the procedures are implemented by qualified personnel. It should also describe how conformance is verified by the pressure piping fabrication contractor. It is recommended that a time period for keeping the radiographic film and NDE documents is specified in the procedures.

NDE subcontractors are not certified by ABSA. Pressure piping fabrication contractors or owners who employ NDE subcontractors should ensure that

the NDE subcontractors perform to the documented NDE procedures, that the procedures meet the requirements of applicable code(s) of construction (such as ASME B31.3, 31.1.....codes) and the current ASME Section V Code, employ qualified technicians (min. SNT-TC-1A Level II for conducting examinations and interpretation of the results), use calibrated equipment and preferably work under a QMS to assure consistency, quality and conformance to the requirements.

Qualification of NDE personnel shall be in accordance with their employer's written practice, which shall be in accordance with the requirements of SNT-TC-1A or ANSA/ASNT CP-189. ISO 9712:2012 based programs (such as CGSB) may be used to fulfill the training, experience, and examination requirements as specified in the employer's written practice.

### 3.3.13 Examination

**Note:** To assure that the responsibilities for carrying out the inspection, verification and examination activities are clearly understood by various personnel, the term 'examination' is applied to the functions performed by the personnel employed by a pressure piping fabrication contractor (e.g. QC personnel) and the term 'inspection' to the functions performed by the owner's inspector, ABSA or by anyone other than the pressure piping fabrication contractor.

#### Requirements

To make certain that the piping conforms to specified requirements at each stage of construction, a pressure piping fabrication contractor shall ensure that:

- the responsibilities for the examination activities and qualifications of an examiner are defined;
- visual examination procedures and personnel qualifications for visual examination, as required by the applicable code of construction, are established and documented;
- the type of examination is specified for various stages of construction and that it is performed;
- QMS examination requirements and related procedures are available and understood by the personnel responsible for the examination activities;
- the materials received from the owner(s) and supplier(s) are examined prior to use to assure conformance with the requirements of the engineering design;
- the 'partial' piping systems and documents received from the subcontractors are examined prior to release for further processing;
- 'partial' piping turnover packages received from pressure piping fabrication contractors within Alberta are accompanied by

‘Partial AB-83’ forms;

- piping systems and documentation received from pressure piping fabrication contractors located outside of Alberta are accompanied by Final/Partial ‘AB-83F’ or AB-83 forms as the case may be and that the systems and documentation are examined prior to release for further processing;
- completed piping systems and documents received from pressure piping fabrication contractors from within Alberta are accompanied by ‘AB-83’ forms and that the systems and documents are examined prior to release for further processing;
- the final examination is carried out in accordance with the documented procedures to complete the evidence of conformance of the finished product to the specified requirements;
- the examination records, which provide evidence that the product has been examined, are maintained; and
- for ASME B31.1 Boiler External Piping, ABSA inspection requirements are addressed.

### **Implementation Guidance**

A pressure piping fabrication contractor should demonstrate conformance to the examination procedures to ensure that the specified quality requirements are met at all stages of construction. Examination requirements should be identified for materials received from the owners and suppliers; for the piping fabrication packages (partial) received from the subcontractors; for the construction activities at the pressure piping fabrication contractor shop and field sites, and, for the finished product to assure overall conformance to the requirements prior to release of the completed pressure piping systems to an owner. Please consult PESR User Guide, AB-516, Section 31 to determine if an AB-83F or an AB-83 is required when a pressure piping system is constructed outside of Alberta.

### 3.3.14 Pressure Testing

A Pressure Test is a critical activity that must be performed safely upon completion of all construction activities such as welding, mechanical assembly, PWHT and NDE.

#### **Requirements**

To assure the safety of the pressure tests, a pressure piping fabrication contractor shall ensure that:

- a documented procedure is implemented to safely conduct the pressure tests;
- over pressure is prevented during the pressure test;
- the pressure test areas are secure and safe for all personnel;
- the procedure is effective and meets the requirements of the engineering design and of the Code of construction;
- the pressure test procedure is complied with;
- the pressure gauges used are calibrated and are of proper range;
- the required examinations are carried out by designated personnel;
- the pressure test records are maintained; and
- for ASME B31.1 Boiler External Piping, prior arrangements are made with an ABSA SCO to inspect and witness a pressure test.

#### **Implementation Guidance**

The pressure piping fabrication contractor should establish and maintain documented procedures for pressure testing the piping systems. The procedures should describe the processes for ensuring that piping systems are pressure tested safely in accordance with requirements of the engineering design, Regulations, and that the personnel responsible for testing are trained to prevent failures during the test. Responsibilities for completion of a pressure test should be defined and understanding confirmed. It is important to note that the piping fabrication contractor must ensure that the fabricator is responsible to ensure that all testing apparatus/assemblies/headers are designed appropriately for the intended test pressures, regardless of test medium.

PESR Section 30 requires that a pressure test be a hydrotest. If a hydrotest cannot be performed, a pneumatic, or a hydro pneumatic or an alternate leak test as provided for in the ASME B31.3 Code (process

pipng construction only) may be performed, provided prior acceptance by an ABSA SCO is obtained. AB-519 provides requirements for alternative test methods that may be accepted for ASME B31.1 and B31.3 closure welds in lieu of the leak testing specified by the PESR. To be eligible for the alternative test methods, either; i) the owner must have an ABSA accepted AB-519 compliant procedure as part of their certified Pressure Equipment Integrity Management System, or ii) the registered piping design must incorporate alternative test provisions for closure welds.

Provision for pneumatic testing of pressure piping systems up to 1677 kJs of stored energy (equivalent to 500 liters internal volume and 2172 kPa internal pressure) may be included as a standard testing procedure in the written description of a QMS provided the description/procedure complies with the requirements of AB-522 document and that ABSA's acceptance is secured. AB-532 provides the minimum requirements for the registration of application-specific pneumatic test procedures that do not fall within the scope of AB-522.



### 3.3.15 Control of Monitoring and Measuring Devices

#### Requirements

To make certain that inspection, measuring and test equipment are capable of consistently achieving specified measurement accuracy, and to assure that proper decisions are made for the acceptance of the piping systems, a pressure piping fabrication contractor shall ensure that:

- a process is developed for determining which measurements are required to be taken during the construction, examination and testing of pressure piping, and, for selecting the appropriate equipment that is capable of providing the necessary accuracy and precision;
- inspection and measuring test equipment are identified, calibrated and adjusted at prescribed intervals, and that the equipment is verified to be in good condition prior to use;
- the equipment is calibrated against internationally or nationally recognized standards;
- the process employed for calibration, and for keeping details of equipment, unique identification, location, frequency of calibrations and checks, calibration method, acceptance criteria and actions required to be taken when the calibration results are unsatisfactory, is defined;
- calibration records of the equipment are maintained;
- the handling, preservation and storage of the equipment is such that the accuracy and fitness for purpose is assured; and
- a method for safeguarding the equipment from unauthorized adjustments is defined.

#### Implementation Guidance

The Monitoring and Measuring Devices that are rented by the owners or those used by external contractors should also be subjected to the above requirements.

### 3.3.16 Competency and Training

#### Requirements

A pressure piping fabrication contractor shall establish and maintain a documented plan for the training of personnel responsible for the construction of pressure piping. A training plan shall address identification of the training needs, provision of training, assessment to assure competency and the maintenance of training records.

#### Implementation Guidance

The objective of describing 'Competency and Training' in the written description of your QMS is to make certain that personnel constructing pressure piping are competent on the basis of appropriate education, training, skills and experience.

Responsibilities for the development and implementation of the training program should be defined in the written description of your QMS. The written description of your QMS should address the following key competency developmental activities:

- Development of a documented Training Plan: The plan should identify the job functions for which training may be needed, competency requirements for each job function, identification of individualized training needs, external training sources that may be used, provision of training, evaluation to assure achievement of competency and effectiveness, and records keeping;
- Identification of Training Needs: List all job functions and establish training requirements for each function. Assess training needs for each employee on a periodic basis;
- Provide training based upon the training needs established above;
- Evaluation to assure achievement of competency and effectiveness: Post training evaluation and periodic competency checks should be done and documented to assure that training provided produced the desired results;
- Maintenance of the records of the procedures used, plans developed, training needs, training provided and the evaluation of training.

Personnel who may in any way effect the quality of pressure piping construction, e.g. the designers, production managers, production supervisors, fitters, welders, purchasers, material receivers, material storage personnel, quality examiners, in-house NDE technicians, pressure testing personnel are some but not all of the personnel who may require training.

ISO 10015, 'Guidelines for Training', may be consulted for the development, implementation, maintenance and improvement of training strategies.

### 3.3.17 Corrective and Preventive Action

#### Requirements

Responsibilities for the development and implementation of the Corrective and Preventive Action program shall be defined in the written description of a QMS. The pressure piping fabrication contractor shall:

- ensure that documented procedures for Corrective and Preventive Action activities are implemented;
- ensure that the procedures include steps to identify a non conformity, immediate action to dispose off a non-conformity, root cause analysis to determine the action to prevent it from happening again, verification of the effectiveness of the corrective action taken and a reference to the 'Forms' to be utilized;
- ensure that appropriate training is provided to effectively implement the Corrective and Preventive Action program;
- review the Corrective Action and Preventive Action Reports/Forms and logs on a periodic basis, evaluate, establish trends and initiate improvement measures as necessary;
- maintain the Corrective and Preventive Action program records.

#### Implementation Guidance

A Corrective and Preventative Action process involves investigation and elimination of causes of nonconforming product/practices, and is meant to prevent them from happening again. The systems should provide critical input to the owner/top management relative to the status of the continuing effectiveness of the QMS.

**Corrective Action** occurs as a result of a reported problem and is considered a reactive approach. Corrective Action should be taken to eliminate the cause of the existing problem with the goal of preventing it from happening again. Corrective Action should not be considered as a disciplinary action or a means in itself, but rather, a problem solving process that analyzes issues with the intent of improvement. **Preventive Action** is the response to information or knowledge that indicates that a potential problem might occur. Using the information will allow the pressure piping fabrication contractor to prevent the problem from happening in the first place.

### 3.3.18 Internal Audits

Organizations employing less than 5 employees or contract personnel are not required to address this section.

#### **Requirements**

To make certain that the pressure piping construction meets requirements at each stage of the construction, demonstrate effectiveness of the QMS, and to identify actions for continual improvement, the pressure piping fabrication contractor shall:

- develop an internal audit process;
- prepare a schedule for conducting an internal audit;
- carry out an internal audit;
- document the audit results;
- communicate the audit results to the appropriate personnel and management;
- ensure that timely action is taken as a result of the audit findings;
- assure that follow-up action to verify the success of the corrective action taken is defined;
- maintain internal audit records; and
- conduct a periodic review of the audit system and report the results to the management.

#### **Implementation Guidance**

A pressure piping fabrication contractor should prepare a plan and procedure(s) which assign responsibilities for the development, maintenance and management of the internal audit process. When an Organization has multiple shops, these facilities should be represented within the audit plan. The process should address the audit schedule, documentation of the audit results, follow up action and communication of the audit results to the appropriate personnel and management. The audit plan and procedure(s) should also assign responsibilities for initiating corrective action, for verifying the effectiveness of the corrective action taken and for the maintenance of the records.

Organizations employing 5 or more employees or contract personnel are required to implement the internal audit program requirements stipulated above. Organizations with fewer than 5 employees or contract personnel are encouraged to conduct internal audits and include the provision in their written description of the QMS. An internal audit process provides the means to any size of pressure piping construction organization to help

identify deficiencies and/or non conformances, take corrective action and continuously improve the effectiveness of the construction processes.

### 3.4 Competency Requirements for Personnel Responsible for assuring quality

Pressure piping fabrication personnel such as a Production Manager, QC Manager and QC Examiners responsible for the construction and for assuring conformance to the quality requirements of the engineering design shall be knowledgeable about the:

- pressure piping fabrication contractor's QMS and quality control processes;
- quality requirements of the engineering design;
- requirements of the Safety Codes Act, PESR and Welder's Regulations;
- requirements of the CSA B51 Code;
- requirements of the applicable ASME Code(s) of construction (such as ASME B31.1, B31.3, B31.5, B31.9);
- requirements of the referencing ASME Codes (such as ASME Section IX and V Codes).

The pressure piping fabrication contractor's management is responsible for ensuring that the personnel appointed are knowledgeable in the aforementioned areas and that their services are available throughout the construction stages and the certification period of the permit.

Documentation of competency review and courses taken and/or in-house study completed should be maintained for review by an ABSA and/or an owner's inspector. ABSA's SCO may evaluate the knowledge level of the QC personnel and may assess courses/training as necessary.

### 3.5 Mechanically Assembled Piping (including Instrumentation Tubing)

Unless exempt by the regulations, mechanically assembled piping systems containing expansible fluid under pressure are designed, manufactured, examined and tested in accordance with the requirements of an ASME B31 pressure piping code, and therefore are treated in the same manner as the welded piping systems as far as the application of the requirements are concerned.

Organizations with a limited/restricted scope, including those who install instrumentation piping/tubing, heat tracing, a simplified QMS is proposed. As an example, instrumentation tubing systems which are assembled using compression fittings or other mechanical means, need not address welding, NDE and PWHT in the written description of a QMS. Generally the instrumentation tubing is run along the piping from one point to another and therefore no construction drawings are utilized. Smaller

organizations who are supplied with pre-engineered designs and materials by an owner may be able to further simplify their QMS. Owners who could apply the partial exemption of PESR, Section 4, do not require a Certificate of Authorization Permit from ABSA for assembling the tubing and therefore the requirements of AB-518 document will not apply, provided all of the conditions listed under that section are satisfied.

### **3.6 Non-Metallic Pressure Piping**

Requirements of the SCA, Regulations, CSA Codes, ASME Codes and of this document apply to non-metallic pressure piping as well.

### **3.7 Buried Piping**

Requirements of the SCA, Regulations, CSA Codes, ASME Codes and of this document apply to the pressure piping to be buried as well. All inspections and testing shall be carried out prior to the pipe being buried/covered.

### **3.8 ABSA Certified Owner-Users of pressure equipment who wish to include Pressure Piping Construction activity in their Integrity Management System (IMS) documentation**

ABSA certified Owner-Users who wish to include construction of pressure piping in their IMS documentation may include a section under the 'Construction of Pressure Piping' (suggested heading) or cover it under the section 'Construction of Pressure Equipment'. All other quality elements required for the construction of pressure piping already exist in the written description of an IMS, but may require updating to assure completeness of guidance to the employees and conformance to the requirements of the AB-518 document. A separate QMS manual for the construction of pressure piping is neither required nor recommended. ABSA certified Owner-Users are not required to submit the AB-518b document to ABSA.

### **3.9 ABSA Certified Pressure Boilers & Pressure Vessel Construction Organizations who wish to include Pressure Piping Construction activity into their existing QMS documentation**

Guidance for the construction of pressure piping should be covered in the written description of an existing QMS as appropriate. A separate QMS manual is neither required nor recommended. The requirements of AB-518 document do not apply.

### **3.10 Inspection Requirements**

Normally no inspections are carried out by ABSA Safety Codes Officers (SCO) for the construction of pressure piping, except for the Boiler

External Piping. The pressure piping fabrication contractor is responsible for the examinations at each location authorized by the permit to assure conformance to the engineering design, applicable ASME Codes, Safety Codes Act, Regulations, ABSA requirements and the requirements of this document. **The owner's inspector is responsible to the owner for conducting verification to ensure that all required examinations and testing are completed, and, to inspect the piping to the extent necessary to be satisfied that it conforms to all applicable examination requirements of the Code and the engineering design. It is the owner's responsibility to assign an inspector who is qualified per the requirements of an applicable ASME B31 code prior to the start of construction.**

Boiler External Piping constructed to ASME B31.1 Code may also be inspected by an ABSA SCO.

An ABSA SCO reserves the right to inspect any pressure piping and/or related documents as necessary.

Organizations manufacturing pressure piping for export from Alberta are cautioned to verify the inspection and certification requirements of the jurisdiction of installation prior to starting a job. Some jurisdictions require inspection and certification by an AI. An ABSA SCO shall be contacted prior to the start of construction if an AI's inspection is required.

### 3.11 ISO 9001:2015 based QMSs

Existing or new QMS documentation utilizing ISO 9001:2015 standard shall address the requirements of this document. The requirements of AB-518 document may be addressed anywhere within the QMS documentation as appropriate. When an ISO 9001:2015 based QMS is in use, an additional QMS manual for the construction of pressure piping is neither required nor recommended. ISO 9001:2015 based quality systems are not required to be registered with an ISO registrar.

### 3.12 Cargo Transport Piping

Organizations engaged in the construction and/or repair/alteration of cargo transport pressure piping shall obtain a Certificate of Authorization Permit from ABSA per the requirements of CSA B620 Code, Clause 8.1.3.4.

- **Scenario 1: Organizations which currently hold a Certificate of Authorization Permit from ABSA for the CONSTRUCTION of Cargo Transport vessels and wants to include the Construction and/or Repair/Alteration of cargo transport pressure piping in the scope of their current authorization:** Construction and/or Repair/Alteration of cargo transport pressure piping shall be addressed in an organization's written description of the QMS. Organization's

current Certificate of Authorization Permit is required to be updated to include the authorization for the 'Construction and/or Repair/Alterations of cargo transport pressure piping in accordance with the requirements of the ASME B31.3 Code'. Conformance with the QMS requirements of the AB-518 document is not required.

- **Scenario 2: Organizations which currently hold a Certificate of Authorization Permit from ABSA for the REPAIR/ALTERATION of Cargo Transport vessels and wants to include the Construction and/or Repair/Alteration of cargo transport pressure piping in the scope of their current authorization:** Construction and/or Repair/Alteration of cargo transport pressure piping shall be addressed in an organization's written description of the QMS. Organization's current Certificate of Authorization Permit is required to be updated to include the authorization for the 'Construction and/or Repair/Alteration of cargo transport pressure piping in accordance with the requirements of ASME B31.3 Code'. Conformance with the QMS requirements of the AB-518 document is not required if the authorized scope for pressure piping is limited to the construction and/or repair/alteration of cargo transport pressure piping in accordance with the requirements of ASME B31.3 Code.
- **Scenario 3: Organizations which currently hold a NB 'R' Stamp for the Repair/Alteration of vessels and wants to undertake the Construction and/or Repair/Alteration of cargo transport pressure piping:** An organization holding a 'R' stamp from NB is deemed to meet the requirements of CSA B620 Code, Clause 8.1.3.4 (b) provided the written description of the QMS addresses the Construction and/or Repair/Alteration of cargo transport pressure piping, the requirements of the PESR and the Welder's Regulation. Conformance with the QMS requirements of the AB-518 document is not required. Organizations operating in Alberta also require a Certificate of Authorization Permit from ABSA in accordance with the requirements of the PESR Section 11(1)(b).
- **Scenario 4: Organizations which hold no Certificate of Authorization Permit from ABSA or no 'R' stamp from the NB and wants to undertake the Construction and/or Repair/Alteration of cargo transport pressure piping:** Organizations operating in Alberta who do not have any authorization from ABSA to Construct and/or R/A pressure equipment or no 'R' stamp from NB, shall conform to the requirements of AB-518 document and obtain a Certificate of Authorization Permit from ABSA to undertake the construction and/or Repair/Alteration of cargo transport pressure piping. Organizations who buy pressure vessels and install new pressure piping to prepare the units for sale shall apply for new construction of pressure piping.



### **3.13 Boilers and Pressure Vessels Repair Organizations**

New or existing organizations who repair/alter boilers and/or pressure vessels and want to undertake construction and/or repair/alteration of pressure piping, shall comply with the requirements of AB-518 document. To comply, an organization may review the written description of its existing QMS and update it to address the pressure piping construction and/or repair alteration requirements and activities that are currently not addressed in the QMS. A separate QMS manual is neither required nor recommended.

### **3.14 Surveillance Audits**

An organization shall submit to Surveillance Audits conducted by ABSA. The audits are a part of a surveillance strategy to assure continual conformance to the QMS and the requirements. An organization may or may not be given advance notice of the audit. A recommendation to continue certification of your piping construction program is based upon a favourable report from the auditor. Per section 46 of the SCA, a permit may be suspended or cancelled if a SCO determines that the QMS is not being followed and that the Act is not being complied with.

## 4.0 CERTIFICATION PROCESS

The steps for obtaining a Certificate of Authorization Permit (new and renewals) are outlined as below:

**Step 1 - Meeting with ABSA** – A meeting is held to provide information about ABSA, and to explain requirements of the Safety Codes Act and Regulations; CSA B51 Code; applicable ASME code(s) of construction (such as ASME B31.3, B31.1, B31.5 and B31.9 Codes); applicable referencing codes such as ASME Section IX for welding and ASME Section V for NDE; requirements of this document; QMS documentation development; Certification Process and achievement of Certificate of Authorization Permit; fees and responsibilities of the Certificate of Authorization Permit holder.

**Note: Step 1 is optional for out of province applicants.**

**Step 2 - Application** – Applicant submits an [Application Form AB-29](#) along with an application fee. If an owner wants to construct pressure piping at multiple shop locations under the same company name and under a single registration number, submission of AB-29b is also required.

**Step 3 - A written description of the QMS and AB-518b submission** – Applicant develops a written description of the QMS that meets the requirements of AB-518 document, the Safety Codes Act and Regulations and submits a draft copy of the written description of the QMS and a duly completed AB-518b checklist to ABSA for review.

**Step 4 - Site audit** – Upon review and acceptance of the written description of the QMS as basis for an implementation audit by ABSA, the owner shall arrange for a piping construction project and demonstrate the implementation of the activities applied for. An auditor(s) from ABSA witnesses the implementation of the program (witness welding/assembly being performed, interview personnel to confirm understanding of the quality processes and review documentation as necessary). The auditor uses the owner's written description of the QMS and AB-518b document as a guide for conducting the audit, however the effectiveness of the QMS as described in the written description is also evaluated and consequently revisions may be required.

**Step 5 - Certificate of Authorization Permit** – If the site audit is successful, a Certificate of Authorization Permit is issued to the applicant. The normal term of the permit is 3 years.

**List of documents that shall be submitted when applying for new certification or for renewals:**

- An Application Form AB-29,
- An AB-29b Form if you want to construct and/or R/A pressure piping at multiple shop locations within Alberta,
- A duly completed AB-518b checklist, and
- A draft copy of the written description of the QMS.

## 5.0 FEES

The fees for the certification activities are charged in accordance with the 'Fee Schedule for the Delegated Functions' (available at <http://www.absa.ca/fee-schedule/>). The application of the fees is described in an attachment to the Application Form AB-29.

## 6.0 EXEMPTIONS

- **No Certificate of Authorization Permit is required for the following piping:**
  - Pressure piping containing non-expansible fluid;
  - Heating plant piping;
  - Pressure piping which is fully vented or is protected by one or more PRDs which are set and sized so that the pressure will not exceed 103 kPa;
  - Pressure piping that falls under the jurisdiction of other Acts (such as Pipeline Act, Gas Code Regulation, Motor Vehicle Safety Regulation);
  - Pressure piping (except for Boiler External Piping) that meets all of the following conditions – does not exceed DN 50; does not exceed MAWP 1035 kPa; design temperature is between -29°C and 186°C or the design minimum temperature is not lower than -46°C provided the pressure piping system components are fabricated from the P-1 or P-8 materials; contains air, nitrogen, argon, carbon dioxide, steam or hot water or contains a mixture of water and glycol which is used to distribute heat for heating a building or heating a process and is **constructed to an applicable ASME code** – is exempt from the requirements of PESR except that accidents shall be reported to ABSA.
- **Design Registration:**  
Design registration is not required with ABSA if the aggregate internal volume of the new piping system is under 500 liters. All other requirements of the QMS, Regulations and the ASME Codes apply.

### Understanding the Exemptions:

The following information is provided to help understand the full scope and level of exemptions and to answer questions that are frequently asked by owners and pressure piping fabrication contractors:

- **Safety Codes Act** (Revised Statutes of Alberta 2000 Chapter S-1, current as of May 31, 2022):  
Section 1, p.6 'interpretations' of the Act - In accordance with this interpretation, if a piping system does not contain expansible fluid then it cannot be categorized as pressure equipment and therefore the requirements of the PESR does not apply.

Section 2, p.7 of the Act lists disciplines, describes the authority of the Minister to exempt any person or anything and the geographical areas to which the Act applies.

**If it is concluded that the Act does not apply, no pressure equipment related requirements of the Act or of the PESR apply.**

- **Exemption Order** (Alberta Regulation 56/2006 with amendments up to 206/2019):  
Pressure piping listed in Section 2(1) of the Exemption Order is exempt from the Act and PESR.

Pressure piping listed in Section 2(2) of the Exemption Order is exempt from PESR, Welders Regulations and Power Engineer's Regulation. Such piping is not exempt from the provisions of the SCA. The pressure piping that is exempt from the PESR, no Certificate of Authorization Permit or design registration with ABSA or an implementation of a QMS is required. WPSs are not required to be registered with ABSA but shall meet the requirements of the ASME Section IX Code. No AB-83 and AB-81 are required to be completed.

- **Pressure Equipment Safety Regulation** (Alberta Regulation 49/2006 with amendments up to 195/2015):
  - Section 1(1)(aa), p.5 of the PESR, if a piping system does not meet the interpretation of a "pressure piping system", the requirements of the PESR do not apply. Additionally if it does not contain expansible fluid, it does not meet the definition of the "pressure equipment" of the SCA, therefore the pressure equipment Regulations under the Act do not apply. If it contains expansible fluid and process changes happen within the piping, it can't be categorized as pressure piping. Such a type of containment may be categorized as a fitting or a pressure vessel. Therefore other provisions of the PESR may apply.
  - Section 4(2), p.6 & p.7 of the PESR includes piping that is exempt from PESR except that Section 35 of the PESR applies (which states that unsafe conditions, accidents or fires shall be reported to ABSA). The exemption 4(2) does not apply to the Boiler External piping.
  - Section 6, p.8 of the PESR lists Codes and Standards that are mandatory. If a Code or Standard is not listed or has not been invoked by a listed Code, Standard or an ABSA requirements document, the requirements of the PESR does not apply.
  - Section 14(6)(a), p.13 of the PESR exempts pressure piping from design registration if the aggregate internal volume of the system does not exceed 500 liters. The volume of pressure vessels to which the piping may be connected is not included in the pressure piping internal volume. The exemption is from design registration only. All other requirements of the PESR shall apply.

**Pressure piping fabrication contractors are cautioned that an owner may choose to disregard the exemptions and apply requirements that are more stringent than the regulations.**

## APPENDIX

### A - Sample description of a QMS element

A written description of the QMS should be developed by the executive management or designated personnel working under the guidance of the management. We recommend summarizing each element of the written description of the QMS by briefly describing the key activities for accomplishing the task(s). The statements included in the written description of the QMS are instructions or requirements of the executive management that should be further detailed in the procedures, standards or work instructions to provide complete details for accomplishing the activities. The requirements of the organization, this document (AB-518) and of the Safety Codes Act should be addressed in the QMS documentation (A written description of the QMS, procedures, standards, work instructions or any other quality documents used to accomplish the construction activities).

A sample quality element is included below for your information.

#### Non Destructive Examination

##### Purpose

To ensure that the NDE required by the engineering design is accomplished, and that it meets the requirements of the QMS, standards specified by the engineering design and of the Safety Codes Act.

##### General

(Name of the pressure piping fabrication contractor) has established documented procedures for NDE and the coordination of those activities. This section describes the system for ensuring that the NDE procedures meet the requirements of the owner, (the name of the pressure piping fabrication contractor), Regulations, the engineering design, ASME Section V, the Code of construction (such as ASME B31.3, ASME B31.1), the implementation steps to be followed by qualified personnel and the verification of conformance to the procedure.

##### Responsibilities

The QC Manager is responsible for ensuring that the requirements defined in this section are followed for all in-house and contract NDE activities. The QC Manager is responsible for coordinating the NDE activities and for ensuring compliance.

## Key Activities

The QC Manager should ensure that:

- NDE required for the piping is determined from the construction drawings or other engineering specification documents supplied by the owner;
- 'lot' sizes are agreed upon prior to start of a job;
- Qualified NDE sub contractors have written procedures that meet the requirements of the current Regulations, ASME Section V Code and the applicable ASME B31 Code of construction. Work performance of the NDE sub contractors should be confirmed by the pressure piping fabrication contractor and acceptance documented;
- Qualified NDE contractors employ certified NDE technicians for the applicable NDE techniques. All examinations shall be performed under the supervision of SNT-TC-1A Level II or III technicians;
- NDE and interpretations are done by SNT-TC-1A Level II or III technicians;
- The NDE contractor employs/contracts a SNT-TC-1A Level III technician to resolve interpretation issues, provide training and certify staff;
- Written instructions (including the acceptance criteria) for performing NDE are provided to the sub contractor and understanding confirmed;
- A system for identifying the welded joints requiring NDE is implemented;
- NDE is reviewed (film and reports) and acceptance confirmed against the Acceptance Standard PEFL-1237;
- NDE reports, radiographic film and construction drawings documenting the NDE are kept on file.

## **Applicable Documents:**

- RT Procedure No. PEFL-1234
- MT Procedure No. PEFL-1235
- UT Procedure No. PEFL-1236
- Acceptance Criteria, PEFL-1237
- Any other procedures or documents required for completing NDE activities

**Note:** PEFL abbreviation and numbers are fictitious and have been used to illustrate the process.

## B - Sample Procedure

Procedures should be written by the department Managers or designated personnel working under the guidance of a Manager. The procedure should address the key activities described in organization's written description of the QMS, describe responsibilities and activities to be performed by the organization personnel, and provide enough details so that the personnel responsible for implementing the procedure are able to complete the job and meet the quality requirements on a consistent basis.

A sample procedure is included below for your information.

<b>RT Procedure</b>	<b>Procedure No: PEFL-1234</b>
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### 1.0 Purpose

This procedure describes the process for the RT of piping systems.

### 2.0 Responsibilities

- QC Manager is responsible for ensuring that RT Procedure addresses the key activities described in the written description of the QMS, and that it is maintained and implemented effectively. The Manager is also responsible for assigning responsibilities to the QC Inspectors for preparing documentation, reviewing reports and radiographs, and for distribution and filing of records.
- QC Inspectors assigned to the project are responsible for carrying out RT related duties described in the procedure below.

### 3.0 Definitions

(Include definitions related to terms used in the procedure. Some of the examples are as follows:)

- RT: Radiographic Testing
- SNT-TC-1A: Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing
- NDE: Non-Destructive Examination
- QC: Quality Control

### 4.0 Procedure

QC Examiner(s) assigned to the project are responsible for implementing the following RT procedure:

- Determine the piping LOT size from the contract documents or from any other document that may provide this information for the purpose of assessing random radiography requirements;
- Determine amount of RT required from the latest construction drawing



marked 'IFC';

- Determine the number of welders used for the construction of the piping lot;
- Select sufficient joints ensuring that the specified RT and the work of each welder is represented;
- Mark the joints to be radiographed on the piping system and on a copy of the latest construction drawing. Identify the drawing as RT Drawing and maintain in the Project File;
- Prepare RT Instructions Sheet(s). The RT Instructions Sheet (Form # 2456) should be completed to provide information to the RT organization about the:
  - (pressure piping fabrication contractor's name) and address;
  - name of the contact person and phone number;
  - date;
  - project number;
  - RT drawing number (with revision status) showing joints to be radiographed;
  - wall thickness;
  - service category (e.g. ASME B31.3 - Normal, Cat.'D', Cat. M, High Pressure, Severe Cyclic);
  - Code of construction year and addenda (no addenda for B31.3 code);
  - joints to be radiographed;
  - requirement for compliance with ASME V Code and the Acceptance Standard PEFL-1237;
  - qualifications of the RT technician (e.g. min. SNT-TC-1A Level II);
  - information required on the radiographs and radiographic report;
  - delivery of radiographs etc.
  - requirements of ASME Section V, Article 2, paragraphs T-291 and T-292 i.e. documentation of RT technique details and radiograph review form shall be complied with.

The completed RT Instructions sheet and the Acceptance Standard PEFL-1237 shall be provided to the radiographer, and understanding confirmed by the designated QC examiner.

#### 4.1 Review RT Report upon receipt from the Radiographer. Ensure that:

- the report is complete (verify against the requirements of paragraph 4.2);
- all of the joints identified by the RT drawing(s) and/or marked on the piping were radiographed;
- all indications are explained;
- the indications were properly interpreted to Acceptance Standard PEFL-1237.

- 4.2 Review radiographs using standard reviewing equipment with a variable light source sufficient for the designated hole/wire of the image-quality-indicator to be visible.

Ensure that:

- the film used is of standard industrial quality;
- the radiographs are identifiable with piping fabrication contractor's name or logo;
- the radiographs are dated;
- the radiographs are identifiable to the project;
- the radiographs include identification of the weld joint;
- the radiographs have used correct IQI and that the designated wire or hole is visible. When placed on the film side, the image quality indicator shall display the letter 'F' on the radiograph;
- Location markers appear on the film;
- the radiographs do not display a light image of lead symbol 'B' on a darker background. This condition indicates insufficient protection from backscatter, rendering the radiograph unacceptable;
- the radiograph's density is acceptable;
- the radiographs include no indications that were not identified and explained by the NDE technician;
- the radiographs include no indications that were improperly interpreted by the technician (verify against the Acceptance Criteria PEFL-1237). If any conflicts arise, a resolution by Level III technician should be sought.

- 4.3 Weld Defects:

- When a weld defect is discovered by RT, shoot 2 tracers of the same kind of welds, by the same welder, and examine by the RT method and from the same lot. If the examination is acceptable (per the Acceptance Standard PEFL-1237), repair the defects found earlier and re-examine by the same method. If re-examination is acceptable, cease further action;
- If defect(s) persist in the tracers, shoot 2 more tracers/defect of the same kind of weld, by the same welder, and examine by the same RT method and from the same lot. If examination is acceptable, repair defects found earlier and re-examine by the same method. If re-examination is acceptable, cease further action;
- If defect(s) persist, RT all welds done by the welder in question in the same lot. Repair all defects discovered. All repairs shall be re-examined and pass subsequent RT.

- 4.4 Upon acceptance, sign and date the reports and the radiographic film envelope.

- 4.5 File documents and radiographs in the project file.

## 5.0 Related Documents

- A written description of the QMS
- RT Instruction Sheet Form 2456 (Form number has been assumed).

## 6.0 Revisions

REV. No.	SECTION	Brief Description of the Revision	DATE	AUTHORIZED BY

## 7.0 REVISION LOG

This document was first issued on May 1, 2009.

- Every five years, an updated edition of the AB-518 document is posted. The Edition No. of AB-518 document changes and the Rev. No. starts at 0, and, all previous year's change identification markings are deleted.
- The changes done to the new edition are summarized under 'Summary of changes' in the table below.
- If any updates happen during the current year, the Edition No. remains the same, but the Rev. No. changes with each posting. The changes are identified with side bars in the margin area.

Revision Log																					
(Editorial revisions are not detailed)																					
Date Issued	Edition	Rev #	Description																		
May 1, 2009		0	First edition issued.																		
Jan. 1, 2010		0	Second edition issued.																		
Jan. 1, 2011		0	Yearly update. General revisions to clarify text.																		
Jan. 3, 2012		0	Yearly update. General revisions to clarify text. Reference to AB-522 included at 3.3.16, Implementation Guidance. Revised 3.1 to align with AB-516 PESR User Guide.																		
Aug 20, 2012		1	Changed reference from AB-518a to AB-29b on page 42.																		
Jan. 1, 2013		0	Editorial changes.																		
Jan. 1, 2014	Edition 5	0	<div>Summary of changes:<table><tr><th>Page</th><th>Location</th><th>Change</th></tr><tr><td></td><td>Throughout</td><td>Editorial changes, text enhancements and updating.</td></tr><tr><td></td><td>Throughout</td><td>The word ‘Manual’ replaced with the wording ‘written description of the QMS’.</td></tr><tr><td>14 &amp; 15</td><td>Sections 3.3.1 and 3.3.2</td><td>Sections 3.3.1 (Title Page) and 3.3.2 (Table of Contents) deleted to facilitate integration into an existing management system’s documentation.</td></tr></table></div>	Page	Location	Change		Throughout	Editorial changes, text enhancements and updating.		Throughout	The word ‘Manual’ replaced with the wording ‘written description of the QMS’.	14 & 15	Sections 3.3.1 and 3.3.2	Sections 3.3.1 (Title Page) and 3.3.2 (Table of Contents) deleted to facilitate integration into an existing management system’s documentation.						
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Jan. 1, 2015	Edition 6	0	Editorial changes.																		
Jan. 1, 2016	Edition 7	0	<div>Summary of changes:<table><tr><th>Page</th><th>Location</th><th>Change</th></tr><tr><td></td><td>Throughout</td><td>The use of the terms shall, must and should made consistent with Clause 1.5 of CSA B51-14.</td></tr><tr><td>22</td><td>Section 3.3</td><td>Requirement 3.3.7, 2nd bullet revised</td></tr><tr><td>34</td><td>Section 3.3</td><td>Requirement 3.3.12, 4<sup>th</sup> bullet revised</td></tr><tr><td>21</td><td>Section 3.3.7</td><td>‘Revision Control’ note added in the Implementation Guidance section.</td></tr><tr><td>47</td><td>Section 6</td><td>Reference to the ‘IB’ document deleted; Updated SCA issuance date.</td></tr></table></div>	Page	Location	Change		Throughout	The use of the terms shall, must and should made consistent with Clause 1.5 of CSA B51-14.	22	Section 3.3	Requirement 3.3.7, 2nd bullet revised	34	Section 3.3	Requirement 3.3.12, 4 <sup>th</sup> bullet revised	21	Section 3.3.7	‘Revision Control’ note added in the Implementation Guidance section.	47	Section 6	Reference to the ‘IB’ document deleted; Updated SCA issuance date.
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Aug. 24, 2017	Edition 8	0	<b>Annual Update</b>																																	
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