



the pressure equipment safety authority

# **Owner-User Pressure Equipment Integrity Management Requirements**

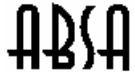
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## 1.1 Introduction

This Integrity Management Requirement (IMR) document has been issued, by the Alberta pressure equipment safety Administrator, to specify integrity management system requirements under the Safety Codes Act. Information to assist owners in developing a practical and effective Integrity Management System (IMS) to ensure the safe operation of their pressure equipment is also provided.

This IMR document cancels and replaces the previous ABSA documents that were issued to define owner-user program requirements.

To ensure the safe operation and reliability of their pressure equipment and compliance with the Safety Codes Act, owners must have effective systems for managing the integrity of their pressure equipment throughout its full lifecycle: from when it is designed, constructed and installed, throughout its service life (operation, maintenance, repairs, alterations, integrity assessments etc.), and decommissioning. An effective Integrity Management System will also enable inspection (integrity assessment) and other resources to be optimized, reduce plant downtime, and ensure that there is appropriate control of all pressure equipment assets.

While the information in this document is intended to assist all owners in implementing effective integrity management systems for their pressure equipment, provision of a documented implemented system in accordance with the IMR is mandatory upon the Administrator's instructing an owner in writing that they shall hold a Quality Management Certificate of Authorization under the Safety Codes Act (Owner-User Certificate of Authorization).

The Safety Codes Act pressure equipment regulation establishes requirements for formal registration of quality management systems and establishes the Administrator's authority to require owners to submit their Integrity Management System for registration. Owners with a satisfactory IMS that is accepted and filed with ABSA, are issued an Alberta Quality Program Certificate of Authorization for the scope of activities that are defined in their quality system manual.

Certification requirements have been enforced through a phased in approach from the larger to smaller pressure equipment owners, and also for other owners on an individual basis when the Administrator decides that the risk associated with their pressure equipment warrants formal submission of their IMS.

Pressure equipment for process applications installed in Alberta covers a broad range of facilities from major petrochemical plants, pulp mills, and power utilities to small oil and gas processing facilities and commercial and other applications. The extent of an owner's Integrity Management System documentation needed to achieve an effective and practical Integrity Management System that meets the IMR will, therefore, vary considerably and must be suitable for the organization's structure and business practices.

The information in this IMR document and other referenced ABSA policy documents was developed, and is updated periodically, based on ongoing consultation with Alberta pressure equipment owners and other stakeholders and information from codes, standards and other published information. This process is designed to ensure that policy documents issued by ABSA, as the Alberta pressure equipment jurisdiction, reflect current best industry practices that are suitable for all industry sectors.

Policy documents issued by the Administrator establish requirements that must be met to be in compliance with the Safety Codes Act.

Two key companion policy documents to the IMR are:

*AB- 505 Risk-Based Inspection Requirements for Pressure Equipment*

*AB- 506 Inspection & Servicing Requirements for Pressure Equipment*

The IMR document and other policy documents are posted on ABSA's website [www.absa.ca](http://www.absa.ca).

Each section in this IMR document covers a fundamental integrity management element. The boxed text identifies the activities that must be addressed for that section element. Guidance information is also provided in each section under the heading Implementation Guidance.

The company who has care and control of the pressure equipment is the organization that would normally be required to provide and maintain an IMS under the Safety Codes Act, and is referred to as an owner-user in this document.

## 1.2 Scope

This document establishes the information that must be covered in an owner-user's Integrity Management System manual when it is required to be submitted to ABSA pursuant to the Act. Practical advice to assist owners to meet the requirements and implement an effective and efficient Integrity Management System and promote consistency in evaluating Integrity Management Systems is also provided.

## 1.3 Definitions

Refer to the Safety Codes Act and regulations for other relevant definitions.

"Act" means the Alberta Safety Codes Act and the regulations made under this Act that apply to pressure equipment.

"ABSA" means the pressure equipment safety authority appointed by the Government to act as the Alberta jurisdiction for administering the delivery of all safety programs under Safety Codes Act as it applies to pressure equipment.

"Administrator" means the Administrator in the pressure equipment discipline appointed under the Act.

"Competent", in relation to a person, means possessing the appropriate qualifications, knowledge, skills and experience to perform the work safely and in accordance with the Act.

"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 power and authority of ownership.

"*Pressure Equipment*" means a thermal liquid heating system and any containment for an expansible fluid under pressure, including, but not limited to, fittings, boilers, pressure vessels and pressure piping systems, as defined in the regulations.

"*Chief Inspector*" means a person who meets the requirements to be in charge of an owner's pressure equipment integrity assessment program.

"*IMS*" means Integrity Management System - a system for ensuring that the pressure equipment is designed, constructed, installed, operated, maintained and decommissioned in accordance with the Act.

"*Integrity Assessment*" means an examination of an item of pressure equipment, related processes and documentation to determine its conformity to the requirements established by the *Safety Codes Act* and the regulations. For the purpose of this document, "inspection" also means integrity assessment.

"*IMR*" means Integrity Management Requirements.

"*ISR*" means Inspection and Servicing Requirements Document.

"*ISO*" means International Standards Organization.

## 1.4 Development of the Integrity Management System

The following outlines typical key steps in developing an owner-user Integrity Management System that is to be registered with ABSA under the Safety Codes Act.

### Management Representative

Appointment by executive management of a competent management representative from within the owner's organization, who shall be given the authority and responsibility to manage, monitor, evaluate, and coordinate the quality management system.

### Resources

Assignment of the appropriate competent resources, responsibilities and authorities needed to develop and maintain an effective documented IMS system.

When integrity assessments are outsourced, ABSA's prior acceptance of the contract inspection organization(s) is required as there are specific requirements that must be met for these organizations.

### ABSA Meeting

Arrange a meeting with ABSA. Key company senior management, the management representative, the owner's Chief Inspector (contract inspection company representative when integrity assessments are outsourced), and other key persons should attend this meeting. This will ensure that there is a common understanding regarding the IMS requirements and what needs to be done to achieve an effective Integrity Management System.

Initial development plan items to include:

### IMS Development Plan

Prepare a plan for developing the IMS. This plan shall be agreed with ABSA and filed with them. Key activities that would be covered in the initial plan include:

#### IMS Training

Complete and document basic IMS awareness training and specific training, as required for personnel who will be involved in pressure equipment integrity management system activities.

#### Inventory of Assets

Completion of an inventory of all pressure equipment items (assets) that are installed at facilities that are owned or operated by the company. This shall initially include all boilers and pressure vessels, fired heaters and heat exchangers. (Critical piping may be identified later as part of the plan assessments activities). Personnel assigned to compile the inventory must be competent and understand the importance of compiling an accurate Inventory.

Prepare and implement a procedure for controlling the inventory of pressure equipment. The procedure shall provide for acquisitions, transfers and divestiture of equipment.

#### Database

Prepare a suitable database (electronic or paper system) of the pressure equipment inventory and establish processes to ensure that the information is kept current.

#### Pressure Equipment Data

Gather available static data. Relevant data will include: any available drawings, data reports, repair and alteration reports, inspection reports, pressure relief valve data and servicing information, process information, corrosion surveys, ultrasonic reports, incident reports, inspection certificates, etc.

Establish an appropriate system for maintaining all relevant documents.

#### Initial Integrity Assessment

Complete a basic visual integrity assessment of the pressure system at each plant facility to identify those mechanical integrity threats that need attention.

Prepare a plan for correcting the hazards identified, completing any in-service inspections and pressure relief valve servicing that need to be completed, initial training, etc.

### Quality Manual

Prepare a quality system manual and related documents in accordance with requirements established in the IMR document.

### Application to ABSA

Provide a copy of the draft quality manual and application (AB-29) form to ABSA.

### Schedule ABSA Audit

Schedule the initial ABSA audit when the program is at a suitable stage of development. This is normally when:

- A meeting has been held with ABSA, key owners' senior management personnel, the management representative, and the in-house or contract Chief Inspector. This will ensure there is a common understanding of IMS requirements, accountabilities and responsibilities.
- The inventory validation is largely completed.
- The database has been established.
- The inspection schedules for the equipment have been developed.
- Basic site assessments have been completed or are in progress.
- Suitable awareness training has been completed for key personnel involved in integrity management system activities.
- A quality system manual has been submitted to ABSA.

An ABSA audit will then be conducted at the owner's head office to confirm management's responsibilities, engineering, and other IMS activities that are controlled from the head office. A site audit will then be scheduled shortly after the head office audit. For major facilities, all activities are normally verified at the site.

Organizations that have provided an acceptable quality management system are issued an Alberta Quality Program Certificate authorizing them to perform activities per the scope established in their manual.

### **Implementation Guidance**

Activities should be prioritized and time lines should be established based on risk and compliance to the Act and related ABSA policy documents (e.g. Inspection and Servicing Requirements Document). The implementation plan must be provided to ABSA for their acceptance (Section 2.7 page 16, provides additional information regarding implementation plans).

## 1.5 IMS Quality Manual

### Requirements

Management shall provide a Quality Manual that defines the system used by the organization, in accordance with this IMR document, to maintain an effective Integrity Management System.

### Implementation Guidance

A quality manual developed in accordance with the IMR establishes the owner-user's executive management's policy, commitment, and accountability to meet the specified requirements and describes the system to achieve and maintain an effective Integrity Management System.

This document has been structured in a similar manner to the ISO Quality Standards. It may be written in any format and sequence that best suits the organization's operation, providing all IMR elements are covered and are readily identifiable – e.g. by a cross referenced index of the elements to identify where they are described in the manual.

ISO 10013 2001 - Guidelines for Quality Management System Documentation- provides guidelines to assist in developing the documentation needed to ensure an effective quality management system. The principles covered in the ISO standard 9000 series may also be of benefit.

The quality manual must accurately describe the system used. It should be a working document to enable management, staff, corporate auditors, ABSA, and other interested parties to readily understand the IMS. It should also serve as a road map to identify the manuals, procedures and other documents that describe the IMS processes, and also explain the interaction between the IMS processes.

The extent of documentation needed to meet the IMR will depend on the size of the organization, type, location, and complexity of facilities, and competence of personnel. It should be the minimum needed to provide a practical effective system that suits the organization's practices. Smaller organizations may find it appropriate to provide detailed descriptions of their work processes within the manual. However, as a general rule, including detailed procedures within the main text of the manual detracts from the manual's readability. For this reason procedures, and other documents which describe the detailed processes, are usually referenced in the applicable manual sections and are maintained as separately controlled documents.

The manual content for each manual section may then be limited to a brief explanation of the responsibilities and control features for the element with a listing of the requirements. The applicable referenced documents that cover the detailed descriptions would then be identified in the section.

Such documents may include: internal procedures and standards, health and safety manuals, quality system manuals for programs that are registered with ABSA under a separate Alberta Quality Program Series (e.g. AQP 2000 for piping and repairs), process safety manuals and training manuals.

An example of a typical format for an IMS manual is provided in Appendix A.

The primary purpose of procedures, work instructions and similar documents is to guide the individuals involved in the applicable activities. These documents must, therefore, be readily available at their point of use. They should be written with the reader in mind to clearly convey what is required to perform the applicable activities. The guidance documents may take the form of flow charts, tables, text, a combination of these or other means, which best suits the organization.

Electronic online document control systems provide an excellent method for controlling documents and for identifying and directing the reader to the documents that contain the detailed requirements.

Key personnel from within the organization, including senior management, persons responsible for health and safety, environmental and pipeline integrity programs, and operations personnel, should be actively involved in the development and implementation of the program. This is necessary to ensure that the system will be practical, add value to the organization’s business, and ensure that activities are aligned and not duplicated, as well as demonstrating compliance with the legislation.

When developing the quality system, the processes and procedures currently in use should be identified and incorporated into the required element descriptions, as applicable, to optimize the effectiveness of the IMS.

**2.0 Owner-User Integrity Management System Manual Required Elements**

**2.1 Title Page**

**Requirements**

The title page shall identify:

- Title of the document that describes the organization’s IMS.
- The name and corporate address of the organization.
- Identify the revision status of the document.

**2.2 Scope and Application**

**Requirements**

This section shall:

- Include a Policy statement that identifies the key purpose of the manual and confirms compliance with the Act.
- Define the scope of the program.
- Provide an overview of the organization and the type of facilities that are operated.
- List of major operating centres (facilities).
- Identify facilities under the scope of the IMS that are operated on behalf of other owners.
- Define the responsibility for key activities by utilizing Table 1 or equivalent.



**Table 1  
Scope and Responsibility**

Name and Title of Management Representative who is responsible for the program.		
Name and Title of Person designated to act as Chief Inspector. Indicate company if contracted.		
Owner's representative responsible for design functions		
<b>Type of Work:</b> Performed by (indicate ABSA Quality Program registration number if covered under a separate certificate)		
	<b>In-House</b>	<b>Contracted</b>
<b>Engineering Functions</b>		
Process Design	<input type="checkbox"/>	<input type="checkbox"/>
Mechanical Design	<input type="checkbox"/>	<input type="checkbox"/>
Technical Engineering services:		
Material Selection	<input type="checkbox"/>	<input type="checkbox"/>
Corrosion etc.	<input type="checkbox"/>	<input type="checkbox"/>
<b>Construction and installation of piping systems:(Piping, valves, fittings</b>		
- Welded piping, valves, fittings	<input type="checkbox"/>	<input type="checkbox"/>
- Threaded piping, valves, fittings	<input type="checkbox"/>	<input type="checkbox"/>
<b>Welder PQ Card Issuance</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Construction of Pressure Vessels</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Repairs and Alterations - Performance of Work</b>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Pressure Relief Valve Servicing</b>	<input type="checkbox"/>	<input type="checkbox"/>

<b>Boiler Certification</b>	<b>Owner-User</b> <input type="checkbox"/>	<b>ABSA</b> <input type="checkbox"/>
<b>Formal ABSA accepted RBI Program used</b> Yes <input type="checkbox"/> No <input type="checkbox"/>		

<p><b>Scope of boiler, pressure vessel and boiler external piping repairs that are Inspected and Certified by the owner-user (per AB-513).</b></p> <p><u>Routine repairs as defined in AB-513</u></p> <p>Owner-User <input type="checkbox"/> ABSA <input type="checkbox"/></p> <p><u>Non-routine repairs that are certified by the owner-user (List).</u></p>          
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**Implementation Guidance**

A policy statement (objectives) that establishes the key purpose of the manual should be included at the beginning of the scope section to provide the focus for all IMS activities.

e. g. This manual describes the pressure equipment Integrity Management System used by (Name of Company) to:

- Assure the safe operation of all facilities that are operated by (Name of Company) in Alberta.
- Demonstrate compliance with the Safety Codes Act.
- Optimize online time and resources.

The scope of the program should be defined and include a statement that the IMS covers the controls for design, construction, installation, operation, maintenance, repair, alteration, in-service integrity assessment, and decommissioning of all pressure equipment under the Safety Codes Act.

A brief overview of the company should be provided to aid the reader in understanding the written description of the quality system.

The overview should include:

- Head office location and main activities that are controlled through the head office.
- Location of main facilities and field control centres in Alberta. Include the name of organizations that have contracted the operation of their pressure equipment to the company.
- Describe the type of processing facilities that are operated by the company, e.g. upstream and midstream facilities, wellhead equipment, collection batteries, compression installations, power generation plants, chemical plants, refineries, and petrochemical facilities.
- The approximate number of items that are operated by the company (those that have an Alberta 'A' number).
- Scope of any formal ABSA accepted RBI program used and the corporate documents that apply.
- Other information that may assist the reader's understanding of the company.

**2.3 Table of Contents**

**Requirements**

This section shall:

Show a Table of Contents that lists the number and title of each section and its location in the manual.

## 2.4 Organization

### Requirements

This section shall include:

A statement that management will ensure that responsibilities and authorities are defined and are communicated within the organization.

Organization chart(s) that identify key positions and their relationship with the reporting structure for integrity assessment personnel illustrated.

A statement that job descriptions shall be maintained as required to ensure the IMS is effective. As a minimum, current job descriptions shall be kept for: the management representative, the person from within the company who coordinates the integrity assessment activities (Chief Inspector when they are a permanent employee of the company) and for any company employees who supervise or perform in-service inspections.

### Implementation Guidance

The organization chart should identify senior management and relevant key company positions. Including the following, as applicable:

- Management Representative,
- Person who coordinates contract integrity assessment activities (in-service inspections etc.),
- Engineering Manager,
- Operations Manager, Area Foreman, Area Superintendent,
- Chief Inspector and Inspection Personnel,
- Chief Power Engineer and
- Maintenance (Manager, Planner etc.).

High-level responsibility summaries for key positions may be included in this section, if desired.

The organization structure for in-house inspection activities should be illustrated.

## 2.5 Definitions of Terms and Acronyms

### Implementation Guidance

All terms and acronyms used with the IMS written quality system should be defined.

## 2.6 Statement of Authority and Responsibility

### Requirements

This section shall include:

- A statement that the written quality system covers the information specified in the IMR and accurately describes the Integrity Management System used by the company.
- A statement that the quality system has the full support of management who will ensure that adequate resources, including competent personnel, are provided to implement the program.
- Title of person designated as the management representative to be responsible for the IMS program; with an explanation that this person, irrespective of other duties, has the defined authority and responsibility for the implementation of the Integrity Management System and has direct access to, and support from, top management to resolve any implementation barriers.
- Signature of senior (executive) management.

## 2.7 Management Responsibilities

### Requirements

This section shall confirm management’s commitment and key responsibilities to the IMS. It shall include:

#### **Planning**

A statement that management will ensure that there is an appropriate planning process to assure effective development and maintenance of the IMS.

#### **Management Commitment**

A statement and evidence that management is committed to the development and implementation of a successful Integrity Management System and to continually improve its effectiveness.

Establish that top management will review the Integrity Management System at appropriate intervals to ensure its continued suitability and effectiveness, and that records of such reviews will be maintained.

A statement that management shall ensure that appropriate communication processes are established within the organization to ensure compliance with the legislation and the effectiveness of the IMS. These processes shall include information on the legislation and issues that may impact the safety of the pressure equipment.

A statement that the organization shall determine and provide adequate competent human resources and the necessary facilities and equipment to effectively implement the IMS. Also, those written contracts that define responsibilities and scope shall be maintained for contracted IMS services such as design, operation, integrity assessment, and IMS

### **Implementation Guidance**

Effective planning processes are necessary to ensure resources are optimized and are deployed effectively. Pre-shutdown planning (often started shortly after the previous shutdown) enables integrity assessments, maintenance, and other activities to be aligned and optimized and down time to be reduced.

It may take some time for an organization to develop an Integrity Management System that fully meets all requirements established in the IMS document. It is therefore crucial that there are appropriate planning processes developed that define the actions and timelines (prioritized based on risk and compliance) for the elements that need to be developed or improved.

For example, an organization that has recently developed a formal Integrity Management System may have compiled an inventory, developed an inspection plan, and performed basic awareness training. However, at this stage, they may not have completed all of the required pressure equipment integrity assessments nor established a formal process for evaluating suppliers, conducting internal audits, completing detailed training or management of change.

Implementation plans should be updated at appropriate intervals. These plans shall be agreed upon with ABSA and also filed with ABSA to document compliance with the legislation.

Job descriptions and documented performance reviews with key performance measures that include key Integrity Management Systems and Health and Safety Program objectives, ensure that Integrity Management Systems and safety objectives are aligned with the corporate vision.

## 2.8 Quality System Documentation

### Requirements

This section shall establish that there will be a documented procedure for controlling the IMS quality system manual, referenced procedures, codes and standards, records and other documents relevant to IMS.

State that these documents shall be maintained, relevant and current under the responsibility of the management representative.

State that there will be documented controls to ensure that:

- The current issues of the appropriate documentation are available at all relevant locations and to all relevant persons.
- All changes of documents or amendments to documents are covered by the correct authorization and processed in a manner which will ensure timely availability at the appropriate location. This shall include ensuring that current versions of the quality manual are provided and accepted by ABSA.
- Superseded documents are removed from use throughout the organization or are appropriately identified as superseded documents.
- Other parties, as necessary, are notified of changes.
- The current revision status of documents is identified.
- Documents remain legible, readily identifiable and retrievable.
- Documents of external origin are identified and their distribution controlled.
- The controls needed for the identification, storage, protection, retrieval, retention time, and disposition of records are addressed.
- That all changes to documents are handled through an appropriate management of changes process.

Records may be in hard copy or electronic format. Electronic systems must be able to readily reproduce a written copy, show the required authentication, and be protected from unauthorized alteration.

When documents are issued in electronic format, the system used to control these documents should be described and include the provision for documenting that key personnel have read and understand the contents of the documents issued.

The person who is responsible for approving and maintaining each essential document should be identified. It should be established that the electronic version is the controlled copy and that any hard copy versions are uncontrolled documents.

**Implementation Guidance**

Key documents that will be controlled under this section should be listed. These include, as applicable:

- IMS manual. A current controlled copy must be provided to ABSA and any revisions to the manual must be accepted by ABSA prior to their implementation.
- IMS Quality System referenced procedures.
- Design specifications.
- Codes and Standards and other documents used.
- Design drawings.
- Process Flow Diagrams.
- Process and Instrumentation Diagrams (P&IDs)
- NDE and Inspection Procedures, Inspection and Test Plans.
- Purchasing Documents.
- Approved Vendors Lists.
- Construction Documentation Packages.
- Other documents and records defined in the individual sections.
- Planning documents.
- Contracts for IMS services.

Equipment records should be retained for the life of the equipment. An owner who sells pressure equipment for use must ensure that all required equipment records including design information, data reports, inspection plans and integrity assessment, repair and alteration records are provided to the person who acquires the equipment.

**2.9 Competency and Training**

**Requirements**

This section shall define the system for ensuring the required competence of personnel who perform work that can impact the effectiveness of the IMS.

Key activities that shall be controlled:

- Identification of experience, qualification and training requirements for individual job positions that is critical to IMS implementation.
- Identification of the training programs or other training resources that are used for training.
- Process for ensuring that personnel, who operate pressure equipment, assess the integrity of in-service equipment or perform pressure welding, hold the appropriate Certificates of Competency as required under the Safety Codes Act and regulations.
- Assessment, reassessment and certification of competence.

- Continuation of training to ensure the required level of competency is maintained, and to reflect any changes in legislation, technology, IMS best practices, etc.
- Records of job functions, training and competency assessment and reassessment.

### **Implementation Guidance**

The owner-user must ensure that all personnel have appropriate qualifications, training, experience and satisfactory knowledge of the requirements of the legislation, inspections and other relevant IMS activities that are to be carried out.

Certification requirements for in-service inspectors are posted on the ABSA website under Workforce Certification.

The level of training and the extent of competency assessment and any reassessment will depend on the person's experience and qualifications, the complexity of the task and the legislated requirements.

Documented awareness training of the applicable IMS requirements should be done at appropriate intervals for all staff that are involved in IMS activities. These would include: management, engineering, operations, maintenance, inspection and corrosion control personnel.

There must also be detailed training, assessment, and certification for individuals who perform critical IMS tasks. These include:

- Personnel performing design engineering activities. Documentation shall be maintained to confirm that they meet the qualification and experience requirements defined in the applicable ASME piping construction Code (ASME B31.3, ASME B31.1) for piping design activities.
- Personnel who act as the owner's inspector for ASME B31 piping construction. Documentation shall be maintained to confirm they meet the required experience and qualifications defined in this code.
- Personnel performing equipment construction, repair, installation and related quality control functions. This would include individuals who install threaded piping and fittings.
- Personnel performing inspection and other pressure equipment integrity assessment activities. The process shall ensure that the Chief Inspector and any person who performs inspections have the required Alberta In-service Inspector Certificate (refer to ABSA IB02-002 bulletin), and is competent to perform the specific type of inspection.
- Personnel who operate the pressure equipment.

## 2.10 Design Control

### Requirements

This section shall describe the system for ensuring that pressure equipment is designed in accordance with the Act, and that the design addresses the service conditions and other process related requirements needed to prevent unintentional release of fluid contained in the pressure system.

Key activities that shall be covered:

- Ensuring that there is a design basis memorandum (DBM) that identifies the design and operating conditions, the service requirements and other information needed to facilitate the safe design, construction, and inspection of the equipment.
- Verifying that personnel assigned to design engineering activities are competent and meet the applicable code experience and qualification requirements, where such requirements exist.
- Preparation, verification and approval of design documents – (specifications, drawings, e.g. P & IDs, Process Flow Diagrams, calculations, etc.) from the DBM.
- Ensuring that the latest code edition and addenda of the applicable construction codes and standards and other related documents are available to design personnel and are used for pressure equipment design.
- Ensuring that all design documents, including any revisions, have the required approval and that the latest revisions are available and are used.
- Ensuring that there is appropriate management of change processes in place for all design activities.
- Ensuring that the design registration and other Safety Codes Act (SCA) requirements have been met.
- Ensuring that design information and alteration procedures for alterations to boilers, pressure vessels, and thermal fluid heaters, including fitness for purpose evaluations when applicable, are submitted to ABSA Design Survey for acceptance prior to the start of work.
- Verifying that manufacturers and piping contractors are qualified and competent to construct pressure equipment in accordance with the design. Retention of all applicable engineering design documents.
- Ensuring that drawings, such as process flow diagrams and P & IDs, reflect the as built condition and are kept current.
- Confirming that the pressure piping installation is in accordance with the Safety Codes Act.

**Implementation Guidance**

The term Design Basis Memorandum (DBM), refers to the document used to identify the design and operating parameters, fluid service and any other information needed to ensure that equipment design will be safe for the intended service. For small upstream projects, this may simply comprise of well fluid analysis, shut-in well pressures, design pressures and temperatures and other basic information that is provided by facility personnel. Whereas for major projects, the DBM may comprise of several detailed documents.

ABSA's design review and registration is based on the information that is provided by the person who submits the design for registration. ABSA's design review is limited to verifying that the design meets the Act and minimum requirements of the code of construction.

Registering the design with ABSA in no way relieves the person who submits the design, the designer, manufacturer, owner and other relevant parties, from the responsibility of ensuring that the design is suitable for the service in which the equipment is to be placed, and that it meets the Act, the construction code, and requirements defined in this section of the IMS.

For items constructed to ASME Section VIII, Division 2, or 3, it is imperative that this equipment is operated within the parameters contained in the User's Design Specification and the Manufacturer's Design Report.

The following should be considered and taken into account when designing pressure equipment:

- The expected working life (design life) of the equipment.
- The properties of the contained fluid.
- All extreme operating conditions including start-up, shutdown and foreseeable fault or emergency conditions.
- Foreseeable changes in the design conditions.
- Conditions for standby operations.
- Protection against system failure using suitable measuring, control and protective devices as appropriate.
- Suitable materials for all component parts.
- The external forces expected to be exerted on the system including external loads from piping or attachments, thermal loads, and wind loading (refer to Section VIII-I UG-22).
- Safe access for operation, maintenance and examination, including the fitting of access openings, safety devices or suitable guards, as appropriate.
- Potential degradation mechanisms and provision of suitable access for detection.

## 2.11 Purchasing and Material Control

### Requirements

This section shall establish the system used to ensure that purchased materials and services for IMS activities conform to the Act and meet the specified purchase requirements.

Key Activities that shall be covered:

#### Evaluation and selection of suppliers

- Define the process used for selecting suppliers based on their ability to supply equipment, materials, and services in accordance with the Act and owner’s requirements. Criteria for selection, evaluation and re-evaluation of suppliers shall be established. Records of evaluation results and any necessary changes to vendor approval arising from the evaluation shall be maintained.
- Maintain a current approved vendors list that is available, to and used by, all personnel involved with purchasing activities.

#### Purchasing

Ensure purchasing information for the product and services to be purchased includes, as applicable:

- Quality System Certification requirements.
- Identification of the applicable issues of the Codes and Standards to which the product must comply.
- Material specifications and other required information.
- The extent and type of service required.
- Owner’s specified requirements.

#### Contracts

Maintain a written contract for inspection, design, NDE, and other services that can impact the effectiveness of the IMS.

Ensure that there are written contracts for all equipment that is operated on behalf of other owners. These contracts shall define who will be responsible for the operation, maintenance, servicing pressure relief valves, inspection, repair, and other IMS activities.

#### Control of Pressure Equipment and Materials at Site

Ensure that equipment and materials received on site meet specified purchasing requirements and the applicable codes and specifications. The control features shall include:

- System for ensuring received materials conform to the correct specifications and quantity.
- System for identifying materials with the correct specification and other required information whenever materials identification will not be retained to the point of use.
- System for identifying and disposing of non-conforming items.
- System for ensuring that the equipment or materials issued complies with the Code and the design specifications.

### **Implementation Guidance**

Suppliers controlled under this section include: pressure equipment construction and repair organizations, organizations who service pressure relief valves, organizations who supply engineering, integrity assessment, or nondestructive examination services; suppliers of basic pressure material (piping, valves, fittings, etc., heat treatment organizations).

Organizations who construct, repair or alter pressure equipment, service pressure relief valves, or conduct welders performance tests, are required to have a valid Alberta Quality Program Certificate of Authorization issued by ABSA for the scope of work. A current posting of these Certificate holders is available on the ABSA website at [www.absa.ca](http://www.absa.ca).

The Safety Codes Act establishes the owner's and operator's responsibility for the safe operation of the pressure equipment under their control. The Chief Inspector should therefore be involved in all proposed operating arrangements and acquisitions to ensure that required information is provided, and the required integrity assessments have been done.

Criteria for selecting suppliers will depend on the criticality of the service or product, the history of the supplier's performance, and other factors. As such, assessment requires one or all of the following:

- Previous satisfactory demonstrated service.
- Inspection upon delivery or at owner's facilities.
- Verification audit by the owner-user.
- Verification done by other bodies such as ISO certification, other owner-users, and ABSA.
- Verification at the supplier's facility.
- Inspection of the product by the owner upon delivery.
- Verification of the documentation provided by the supplier.

Purchasing – when equipment is ordered verbally, the process used, to ensure that the buyer is provided with the correct design specification information and other required ordering information and that the ordering information is relayed to the personnel who will be receiving the material, must be described. The IMS shall have provisions to ensure the adequacy of specified purchase requirements prior to their communication to the supplier.

A written contract should include the type and extent of the service.

## 2.12 Construction and Installation of Pressure Equipment

### Requirements

This section shall establish the methods used to ensure that pressure equipment is constructed and installed in accordance with the Act and the applicable Codes of Construction and meets the design requirements.

Key Activities that shall be covered:

- Coordination and control of pressure equipment manufacturers and organizations that install pressure equipment.
- Surveillance of contractor’s quality control systems.
- Determining need and extent of any source (shop) inspection.
- Verifying that contract organizations have the required capabilities and are approved vendors.
- Ensuring that the supplier is provided with the current versions of required specifications and drawings and the information is clearly defined and is understood by the supplier.
- Appointment of competent persons to act as the owner’s inspectors for code pressure piping construction (refer to Training and Competency section).
- The process for reviewing and retaining completed project packages and the required data reports and that Alberta Piping Construction data reports (AB-83) are provided and are completed correctly.
- Verifying that the design has been registered in accordance with the Safety Codes Act, when applicable, and that Completion of Construction Declaration forms (AB-81), are provided to ABSA for registered and piping designs.
- Notification to ABSA of installation inspections as required.
- Written procedures that meet ABSA requirements are maintained for new construction activities that are completed directly by the owner.

### Implementation Guidance

The extent and need for source (shop) inspections should be defined. The manufacturer must have a valid Alberta Quality Program Certificate for the scope of work, but this does not necessarily mean that they have the capabilities to build the type of equipment that is required. This should therefore be verified during the vendor approval process and controls implemented to ensure that the user’s requirements are incorporated in construction.

It should be noted that ABSA’s construction inspection activities are limited to Code inspection of boilers, pressure vessels, thermal fluid heaters, indirect fired heaters, and boiler external piping. ABSA does not inspect ASME B31 piping (except for boiler external piping), nor does it do detailed verifications of the location and orientation of nozzles, fittings, internals or the adequacy of coatings and paint, and other company requirements that may exceed code requirements.



The criteria for determining the need and extent of the owner's inspections should be defined and will depend on factors such as the complexity and service of the equipment, and knowledge of the manufacturer's capabilities.

The owner is required to provide an owner’s inspector for the pressure piping construction. Pressure Piping Data Reports (AB-83 forms) must be certified by the organization owner’s inspector.

The regulations require that contractors, who construct, repair or alter pressure equipment and service pressure relief devices, must have the appropriate Alberta Quality Program Certificate of Authorization. An owner may maintain separate AQP certificates and then reference the quality systems for these activities, or may elect to have the activities incorporated in the scope of their owner-user Certificate of Authorization. In any case, the scope of construction, repair and alteration or relief device servicing work, that is done directly by the owner, must be defined in the scope section of their IMS manual and, as applicable, separate procedures, which meet the requirements established by ABSA, must be developed and referenced in the construction section of the manual.

Any replacement of valve, and fittings and installation of threaded piping, as well as welded piping, is subject to the above requirements.

**2.13 Control of Monitoring and Measuring Devices**

**Requirements**

This section shall define the procedure used to control, calibrate, and maintain monitoring and measuring devices.

Key controls that shall be covered in the documented procedure include:

- Ensuring that each measuring device is calibrated or verified, at specified intervals or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification shall be recorded.
- Ensuring that each item of measuring equipment is identified to enable the calibration status to be determined.
- Control of issue of equipment to ensure that it is suitable for intended use, the calibration is current; and that it is examined after use.
- Measures to ensure that verifications accepted based on equipment that is found to be out of calibration remain valid.

**Implementation Guidance**

Monitoring and measuring devices that are owned or rented by the owner or contractors are to be covered under this section and include devices for verifying the in-service condition of pressure equipment, such as ultrasonic thickness measuring equipment, magnetic particle examination equipment, test pressure gauges, mechanical measuring instruments, and coating test equipment.

## 2.14 Operation

### Requirements

This section shall define the system used to ensure that pressure equipment is operated safely in accordance with the Act.

Key activities that shall be covered are:

- Process for defining the safe operating limits of the equipment and ensuring the equipment is operated within these limits.
- Ensuring there are adequate procedures to document critical tasks.
- Ensuring there are suitable instructions for the safe operation of the equipment.
- Ensuring that the required operating history for equipment is recorded and controlled to ensure the design limitations of the equipment are not exceeded. This shall include items designed to ASME Section VIII, Division 2 or 3 code rules and other cyclic service equipment.
- Ensuring that the personnel operating the equipment are competent.
- Maintenance of appropriate training and competency assessment records.
- Responsibilities of the chief power engineer and role in the Integrity Management System.
- Verifying that the operator’s observations that may impact the integrity of the pressure equipment are communicated to the appropriate personnel.
- Notification to engineering and inspection per MOC processes when equipment is operated outside of design conditions.

### Implementation Guidance

The exact nature and type of safe operating limits which need to be specified will depend on the complexity and operating conditions of the particular system. For small simple processes, establishing maximum safe operating pressure and temperature limits and shutdown keys may suffice. Whereas, larger complex systems may need a wide range of conditions specified - max and min pressures and temperatures, nature, volumes and flow rate of contents, operating times, heat input or coolant flow etc. In all cases the safe operating limits should incorporate a suitable margin of safety and must consider the control range of the instrumentation. The IMS should channel any changes to specified limits into the management of change process.

A suitable method for recording and retaining information about safe operating limits and any changes to them should be used.

The Occupational Health and Safety Act places a duty on the employer to ensure that anyone operating equipment or managing or supervising its use should have received adequate training.

The owner should provide adequate and suitable instructions for the safe operation of their pressure equipment and define any action to be taken in the event of an emergency and ensure that it is not operated except in accordance with these instructions. Typical documents include current operating manuals, OEM data books and other written procedures.

## 2.15 Management of Change (MOC)

### Requirements

This section shall include a Management of Change (MOC) system for permanent and temporary physical and operational changes to pressure equipment, changes to procedures, standards and other IMS documentation and organizational changes to assure that the integrity of the pressure system is not adversely affected by such changes.

The MOC procedure shall be documented and include:

- Identification of what activities are subject to MOC and what are considered replacement in kind.
- The technical information to support the reason for the change.
- Determining any impact the change may have on health and safety.
- Process to ensure the MOC procedure has been correctly applied.
- Duration of the change, (permanent or time if temporary).
- Process to ensure that the required authorization from all relevant disciplines is obtained.
- Training of operating and other personnel, whose job tasks will be affected by the change, prior to implementing change.
- Updating of process safety information and procedures when the change results in a change in the processes described in the procedure(s).

### Implementation Guidance

Management of Change is a formal system to evaluate, authorize, and document changes before they are made and to ensure that the changes made do not adversely affect the integrity of the facility.

It is used to understand the overall impact to an operating system and to apply appropriate controls for eliminating or reducing identified risks to acceptable levels. Assigning accountability for identifying and controlling hazards associated with change is a key activity.

MOC applies to any permanent or temporary change during the design, construction, installation, operation, maintenance modification, and decommissioning of facilities or pressure components.

### Examples of Change:

- Changes from the original design specifications of the equipment. This includes an addition or deletion to any existing equipment facilities, systems or the installation of new equipment, facilities or systems equipment, and temporary changes such as installation of leak containment boxes.
- Changes to the process design.
- Changes in the operating conditions of the equipment that are outside the approved operating envelope - pressure - temperature, flow rates, process fluid composition, etc.
- Material/specification changes.
- Changes in the way critical activities such as engineering, operating, inspection and maintenance are done.

- Change in key personnel including contract personnel.
- Change of organization structure or reporting structure.

The procedure should cover:

- Key MOC steps.
- Defining what is replacement in-kind that does not require MOC, and what is subject to MOC.
- Assigning competent personnel for MOC activities.
- Process for tracking progress of action items and ensuring close out of critical MOC outstanding items prior to change.
- Defining who prepares the basis for change.
- Identifying when a risk assessment, hazop, or process hazard analysis is required as part of the change process.
- Documentation requirements including the scope, justification for the change and any updating that is needed to the design drawings, specifications or operating procedures.
- Pre-startup safety review to confirm the change was made as designed and that the relevant details/training has been communicated to applicable personnel.

The extent of the documentation required will vary considerably depending on the type of facilities and equipment. A number of owners have refined their MOC documentation because over documentation and duplication had seriously compromised the effectiveness of their MOC process. The documentation and process should therefore be the minimum needed to assure the MOC process is effective and be built into the existing work processes.

It is recognized that it may take some time for an organization to fully implement a formal MOC system that covers all aspects of change.

The following may be appropriate for the initial development phase of an owners MOC system:

- Prepare a simple document (e.g. flowchart with text) that defines the key MOC steps and responsibilities, and which establishes what shall be subject to the management of change process and what can be considered replacement in-kind. This will require input from key personnel in the organization.
- Prepare a document to describe required approvals for key steps.
- Provide appropriate awareness training to facilities and other persons involved in MOC activities.
- Designate a site MOC representative to coordinate all MOC activities at key operating centres and to ensure that the required reviews, approvals and documentation, and other activities are completed. All site management of change issues would be routed through the MOC representative.
- Perform specific MOC training for the MOC coordinator and personnel involved in the detailed MOC process.

## 2.16 Integrity Assessment Program

### Requirements

This section shall describe the system for ensuring that the required inspections and other integrity assessment activities are done, to assure the fitness-for-purpose of the pressure equipment throughout its full life cycle and compliance with the Act.

*Key activities that shall be covered:*

#### Assigning Resources

Appointing the person who is responsible for the integrity assessment program and designating the individuals who will assume these responsibilities in this person's absence.

Ensuring that:

- All personnel and organizations assigned to integrity assessment activities, including contracted services, meet the requirements established by the Administrator.
- A written contract is maintained for all contract inspection and nondestructive examination activities.
- There is effective supervision of inspection personnel by competent individuals.
- Inspection personnel are free of any commercial, financial and other pressures that might affect their judgment.
- That any individuals or organizations cannot influence the results of inspections carried out.
- Confidentiality of information obtained in the course of inspection activities is maintained.

#### Planning

- Maintaining a suitable planning process to ensure that integrity assessment activities are done in accordance with requirements established by the Administrator, and are appropriate to ensure the safety and fitness for purpose of the equipment.

#### Pressure Equipment Assets and Records

- Establishing and maintaining an accurate inventory of all pressure equipment.
- Maintaining records of: design and manufacturing information, maintenance, inspection, servicing, tests, alteration or repair of each item of pressure equipment or system.
- Providing ABSA with required inventory information and other records as required under the Act.
- Providing the pressure equipment records to new owners when pressure equipment is sold or otherwise disposed of, as required under the Act.

- Notifying ABSA in writing when a boiler, pressure vessel, fired heater or thermal liquid heater is bought, sold, rented, relocated or otherwise disposed of, as required by the Act. This shall include equipment that has been decommissioned for later use.
- Establishing a suitable system for retaining and displaying Certificates of Inspection.

Integrity Assessment

Hazard Assessment

- Establishing suitable processes for identifying and controlling hazards at their facilities. This shall include visual assessment of the pressure system at each facility to identify mechanical integrity threats, the fluid service and other basic information needed to prepare appropriate inspection plans for the pressure equipment and ensure safety, fitness for purpose and compliance with the Act.
- Ensuring that appropriate assessments have been done at facilities that will be operated on behalf of other owners and when existing facilities are acquired.

Inspection Procedures

- Developing and maintaining appropriate inspection procedures in accordance with requirements established by the Administrator, and ensuring these are available, understood, and used by personnel performing the applicable inspections.

Inspection Plans and Strategies

- Ensuring that equipment specific inspection plans and strategies are established for pressure equipment and are approved by the Chief Inspector.

Initial Inspection Prior to Entering Service

- Verifying that an inspection of each item of pressure equipment is completed after the equipment has been installed and prior to entering service.
- Ensuring that all ABSA inspections for issuance of permits (Certificates of Inspection) required under the Safety Codes Act have been completed prior to the pressure equipment being placed in service.

Periodic Integrity Assessment

Ensuring that periodic assessments are done in accordance with the requirements established by the Administrator and inspection plans and ensure fitness for purpose of the pressure system. These shall include:

- External Inspections.
- Thorough (internal or equivalent) inspections.
- Corrosion surveys (UT Surveys etc.) and other condition monitoring activities needed to assure the continued safe operation of the equipment.
- Review and approval of UT and other monitoring results by a competent individual who holds the required in-service inspector certificate (ISI Inspector).
- Assigning appropriate inspection intervals in accordance with requirements set by the Administrator.

- Preparation and maintenance of detailed inspection reports for each item identified in the inspection plan.
- Certification of the report by an Alberta In-service Certified Inspector and the Chief Inspector.
- Submission to ABSA of the inspection status summary reports, authenticated by the Chief Inspector, and in a form and within a time period acceptable to the Administrator.

Close Out of Inspection Findings

- Ensuring that appropriate timely corrective action is taken for inspection findings and for other integrity assessment activities that require follow-up.

**Implementation Guidance**

The following items of pressure equipment are to be included in the integrity assessment program:

- Boilers.
- Pressure vessels including fired heaters and heat exchangers- to be inspected and reported individually, except that some equipment, such as small pressure vessels and other items that are registered as fittings, may be inspected as part of the piping system.
- Piping when its mechanical integrity is liable to be significantly reduced by corrosion, erosion, fatigue, or any other factors, and failure can give rise to danger.
- All protective pressure relief devices.

All pressure equipment installed at pressure equipment facilities, including mothballed equipment, and equipment in storage must be included in the integrity assessment program.

To optimize resources and ensure that integrity assessment activities provide an appropriate level of control, operations, maintenance, engineering, health and safety and other related disciplines must be fully integrated and aligned with integrity assessment activities.

The owner will therefore need to designate a competent person who has the defined authority, responsibility and resources to coordinate all in-house and outsourced integrity assessment and related activities.

Appropriate training and competency assessment processes must be in place for persons performing key integrity assessment activities. These include verifying and controlling pressure equipment inventories (assets), hazard assessments, operators, in-service pressure equipment inspections, installation inspections and related monitoring activities.

Personnel who inspect and certify installed pressure vessels, boilers, fired equipment and similar equipment, and those who supervise in-service inspection staff, shall hold the required Alberta In-service pressure equipment Inspector Certification and be certified as competent to perform the specific type of inspection.

The requirements established by the Administrator for In-Service Inspectors are defined in Information Bulletin IB02-002, which is posted on the ABSA website.

To assure the safe operation of his pressure equipment and to comply with the legislation, it is crucial that the owner maintains an accurate inventory of all pressure equipment that he operates.

Accordingly, validation of equipment inventories must be done by competent personnel who have the appropriate documented training and experience to ensure the process is effective. The inventory information that needs to be maintained would normally include:

- Alberta registration number ('A' number) for all equipment that requires an Alberta Certificate of Inspection.
- Owner's unique ID number.
- Equipment description.
- Equipment location.
- Nameplate information.

The inspection and servicing requirements that must be met in Alberta are defined in the Inspection and Servicing Requirements Document AB-506 (ISRD), which is posted on the ABSA website. This document covers the inspection practices and procedures for determining inspection requirements and appropriate inspection and servicing intervals. It references the relevant sections of recognized international standards that must be followed, such as, the American Petroleum Institute Code API 510 Inspection of Pressure Vessels, API 570 Piping Inspection Code, and the National Board Inspection Code NB23.

Factors that must be considered in determining the frequency and type of inspection include:

- Safety record and previous history of the system.
- Any generic information about the particular system.
- The current condition of the equipment.
- The expected operating conditions.
- The fluids in the system.
- The standard of technical supervision, operation, maintenance and inspection in the owner's organization.
- The effectiveness of any on-stream monitoring.

Assessment of the pressure plant by competent personnel is a key activity in ensuring that the fluid service, and other relevant data needed to develop a suitable inspection plan for the equipment, is available.

It is common practice to record the fluid service corrosion circuits on the piping and instrumentation drawings, or process flow diagrams, or to prepare a simple block process diagram, which shows the location of the equipment and relief protection, when current detailed P & ID's or PFD's are not available.

The ABSA document titled *Risk-Based Inspection Program for Pressure Equipment (AB-505)*; covers the requirements that must be met when an organization uses a formal ABSA accepted Risk-Based Inspection (RBI) process to determine inspection requirements and intervals, instead of the progressive time based grading system established in the ISRD.

The scope of the initial (Installation) inspection for boilers and pressure vessels should include:

- Verify that the correct Manufacturer’s Data Report is available.
- Verify that the design has been registered with ABSA.
- Confirm that the nameplate information is correct, per the Manufacturer’s Data Report.
- An external examination for visible damage, and to ensure the equipment has been installed correctly.
- Verify that the correct pressure relief devices have been installed in accordance with the Safety Codes Act.
- Verify that the vessel is identified with an ‘A’ number and an Alberta Certificate of Inspection has been issued (unless otherwise exempt per the Safety Codes Act).
- Confirming that the related pressure piping has been installed in accordance with the applicable Codes and the Act.

Inspection plans for new equipment should be prepared within a reasonable period of time of the installation inspection (not to exceed 12 months). Existing inspection plans should be reviewed at appropriate intervals, and updated as required based on inspection results, advances in technology, and other information.

Equipment inspection plans or supporting documents should include:

- The potential damage mechanisms (modes of deterioration) for the specific equipment.
- The examinations and inspections required to detect and evaluate the damage mechanisms.
- Corrosion monitoring plans such as NDE surveys.
- Preparatory work to enable the required examinations and inspections to be done effectively and safely.
- Date of the next external and thorough inspection intervals for the pressure equipment.
- Servicing and testing of pressure relief devices and other protective devices.
- Confirming that the required integrity assessments have been done to assure the safe operation and compliance for any equipment that is owned by another organization, but is operated by the owner-user under the scope of their IMS.

## **2.17 Nondestructive Examinations and Testing**

### **Requirements**

This section shall establish the system for ensuring that nondestructive examinations, metallurgical tests, and other processes used to assess the integrity of pressure equipment meet their intended purpose.

Key activities that shall be covered:

- Approval of special process contractors per requirements in the Purchasing and Material Control section of this IMR document.
- Ensuring written requirements are provided to contractors.
- Ensuring written procedures are developed and followed for special processes.
- Ensuring special procedures are validated.
- Personnel qualification and certification requirements are verified.

- Coordination of contract activities.
- Ensuring that corrosion monitoring plans are developed by competent personnel, and approved by the Chief Inspector, and that results are reported and are on file.
- Ensuring that competent personnel assess corrosion monitoring results and that results are verified promptly.

**Implementation Guidance**

To ensure the continued safe operation of the equipment, it is crucial that nondestructive examinations and other corrosion monitoring activities are suitable for detecting any problems before they adversely affect the integrity of the equipment. Competent resources must be assigned to ensure that:

- Corrosion monitoring activities are effective.
- The nondestructive examination methods chosen are capable of identifying the potential defects.
- That the examinations are done at the correct locations and intervals to enable such defects to be identified before they adversely affect the integrity of the equipment.
- Results must be reviewed upon completion of the examination by competent persons to flag any findings that may indicate potential problems and to identify any follow-up action needed. There must also be provision to ensure that any such follow-up action is completed in a timely manner.
- The process should ensure that inspection plans and intervals are adjusted accordingly and are approved by the Chief Inspector.

**2.18 Repairs and Alterations to Pressure Equipment**

**Requirements**

This section shall define the system used to ensure that repairs and alterations to items of pressure equipment, both of a temporary and permanent nature, are done in accordance with the Act and that the safety of the equipment will not be adversely affected.

Key activities that shall be covered:

General requirements

- Ensuring that work is done by organizations that have a valid Alberta Quality Program Certificate of Authorization and capabilities for the scope of work.
- Coordination of contract and in-house work.
- Ensuring that the repair/alteration organization is provided with all the technical and quality standards needed to develop the work procedure and complete the work in accordance with specified requirements and the Safety Codes Act.

- Ensuring that the repair and alteration procedure covers all required technical and quality standards for the service in which the item will be placed.
- Appropriate inspection and other competent resources are deployed to ensure the repair or alteration work is done safely and in accordance with the Act.
- Provision for documentation of the repair or alteration, including any design changes, repair and alteration procedures, reports and quality system records, to be retained on file.
- Ensuring that the equipment inspection plans for the item and system are reassessed and inspection requirements and intervals are revised as required.
- Providing controls to ensure that any hot taps and any temporary enclosures installed to maintain the integrity of the pressure equipment and prevent leakage are suitable and meet the requirements of the Act.

Specific requirements for Boilers, Pressure vessels, thermal fluid heaters, and boiler external piping:

- Ensuring that the repair/alteration procedure has prior approval from the company's Chief Inspector and, as applicable, ABSA.
- Ensuring that proposed alterations are accepted by ABSA Design Survey.
- Provisions to ensure that an ABSA Safety Codes Officer (SCO) is notified of the work and that the SCO's prior acceptance of the procedure is obtained – as required per requirements established by the Administrator.
- Ensuring that repairs and alterations are inspected and certified by an ABSA SCO or a competent person who holds the appropriate Alberta In-service Inspector Certificate – per the requirements established by the Administrator.
- Making certain that a copy of the Alberta Repair and Alteration Report AB-40 (AB-83 for boiler external piping) is retained on file and the original form is provided to ABSA.

Specific requirements for pressure piping:

- Ensuring that the inspections required under the applicable ASME B31 piping code are done by a competent owner's inspector who meets the qualification and experience requirements of the code.
- Ensuring that pressure piping AB-83 form, certified by the owner's inspector, is kept on file.
- Ensuring that the design for alterations and additions to piping systems and AB-81 forms are submitted to ABSA in accordance with Section 2.10 of this document when required by the Act.

**Implementation Guidance**

The organization assigned to perform repairs or alterations must be approved in accordance with the purchasing section of this manual, Section 2.11.

The owner should ensure that the Chief Inspector's acceptance is obtained for all proposed repairs and alterations. This is necessary to ensure that all service requirements are taken into account so that the integrity of the item is retained. Special provisions for welding and other material related requirements may need to be covered in the repair/alteration procedure to

ensure it is suitable for the fluid service. Also, original Code of Construction requirements, such as heat treatment and hydrostatic testing, may not be practical. There may be additional factors involved in the repair or alteration that need to be taken into account, such as the vessel location and weather conditions.

The reason for the repair must be determined and the in-service inspection plan for the item reviewed and the inspection requirements and intervals adjusted as required.

All repairs or alterations to boilers, pressure vessels, fired heaters and thermal fluid heaters that are done at a contractor's facility must be inspected and certified by an ABSA SCO.

Hot taps and temporary closures may only be used in extenuating circumstances, and comprehensive controls must be applied for such installations to ensure that the safety of the equipment is not adversely affected. Justification, and detailed documentation to support any proposed hot taps and closure installations, must be provided to ABSA Design Survey and their acceptance for such proposals must be obtained before the work is started.

Suitable procedures must be in place to track and control temporary closures to ensure their timely removal and permanent restoration of the equipment.

Further information regarding repair and alteration requirements is provided in Alberta Repair and Alteration Requirements document AB-513 which establishes the scope of repairs that can be certified by the owner-user's inspector. These documents, the repair and alteration report (AB-40) with preparation guide, and AB-83 and AB-81 piping forms are available on ABSA's website.

## 2.19 Overpressure Protection and Protective Devices

### Requirements

This section shall define the key activities needed to ensure that pressure relief valves, rupture discs and other protective devices, are designed, installed, maintained and kept in service (in accordance with the Act) to ensure that the design and safe operating limits of the pressure equipment system are not exceeded.

Key activities that shall be covered:

- Maintenance of the applicable design specifications for the relief devices.
- Ensuring that the over pressure protection for the pressure equipment and system is adequate.
- Ensuring that pressure relief devices are serviced in accordance with the requirements established by the Administrator and at intervals that are appropriate to ensure they will operate as designed.
- Ensuring that pressure relief devices are protected from damage during their removal, servicing and re-installation and that they are re-installed in their correct location.
- That servicing of pressure relief valves is done by an organization that has a valid Alberta Quality Program Certificate of Authorization for the scope of work and is an approved vendor. Refer to Section 2.11 of this manual.
- Ensuring that pressure relief system designs that have isolating valves in the path of pressure relief devices are approved by the Administrator prior to their installation.
- Maintaining a written implemented procedure that meets ASME Section VIII Division I Appendix M requirements, for controlling isolating valves installed in the path of pressure relief devices.
- Maintaining records of the servicing and replacement of pressure relief devices.
- Assigning appropriate servicing intervals based on the servicing condition reports and other operating information.
- Maintaining testing records for other protective devices, such as emergency shutdown (ESD) and over pressure and critical temperature shut down controls.

### Implementation Guidance

*API Recommended Practice 576—“Inspection of Pressure-Relieving Device”*, provides detailed recommendations for the inspection and control of pressure relieving devices at user’s facilities.

This document includes a cautionary note that it should not be construed as a code of rules or regulations. *AB-506 – Pressure Equipment Inspection Service and Requirements* document, establishes requirements for assigning maximum servicing intervals of pressure relief devices installed in Alberta. There are also specific Alberta requirements for organizations who set and service pressure relief valves.

## 2.20 Internal Audits

### Requirements

This section shall describe the audit process used to determine the effectiveness of the IMS and to identify areas where the Integrity Management System can be improved.

Key activities that shall be covered:

An audit procedure shall be developed which shall include:

- Establishing an audit schedule.
- The audit criteria scope and frequency of the audits.
- Methods and responsibilities for planning and conducting the audits.
- Documents used for conducting and reporting the audit findings and maintaining audit reports and other related documents.
- Ensuring timely action is taken for the audit findings.
- Follow-up action to verify the success of the action taken is defined.

The manager responsible for the area being audited shall ensure that actions are being taken without undue delay to eliminate detected non-conformities and their causes. Follow-up activities include the verification of the actions taken and documentation of the verification results.

### Implementation Guidance

ISO 10011 1990 provides guidelines for auditing quality systems that will assist organizations to ensure that their auditing processes are effective.

## 2.21 Corrective and Preventative Actions, Accidents and Incidents

### Requirements

This section shall define the system used to ensure that issues, that may negatively impact on the safety of the pressure equipment, result in non-compliance to the Safety Codes Act, or jeopardize Integrity Management System requirements, are investigated, corrected, and reported and suitable action is taken to prevent their recurrence.

Key Activities that shall be covered:

Ensuring that accidents and unsafe conditions are reported to ABSA, as required by the Act.

To establish a formalized process for determining the root cause of an incident, near miss, or non-compliance issue and taking appropriate action to prevent its recurrence:

- To ensure that activities are reported to the appropriate authorities within the organization.
- Provide for reports and other documents used to record the situations, the corrective action and preventative actions taken. Documents shall include the required approvals of the Chief Inspector, other relevant personnel and, when applicable, ABSA.
- Tracking and controlling the completion of the corrective and preventative action and verifying its effectiveness.
- Review of an incident, near miss, non-compliance and other relevant information, to determine and implement the action needed to prevent a recurrence and improve effectiveness of the Integrity Management System.

### Implementation Guidance

The Safety Codes Act Section 59 and Section 17 of the *Administrative Items Regulation* establish the requirement for reporting accidents, unsafe conditions and fires to ABSA.

Items that should be considered when preparing the description of the accident and incident processes include:

- Who is to be notified internally?
- Who notifies ABSA and when? Who has ABSA’s contact lists and where are they kept?
- How is the accident/incident scene controlled, and is not disturbed unless advised by an ABSA Safety Codes Officer?
- When is the initial report provided to ABSA? Who is responsible?
- Who is responsible for submitting the final report with recommendations/actions to ABSA?
- Ensuring that the information required in the Act is specified in any reports submitted to ABSA.

Accidents that must be reported include:

- All accidents involving pressure equipment (boiler, pressure vessel, pressure piping system, fitting, or thermal liquid heating system) that result in damage to property or injury to, or death of a person.
- Accidents not caused by pressure equipment, but having some impact on pressure equipment.

Unsafe Condition Reporting

- The owner (or designate) of pressure equipment must promptly report any “unsafe condition” to ABSA.
- Reporting unsafe conditions is a requirement under the *Safety Codes Act*. See Section 59 of the *Safety Codes Act* and Section 3 of the *Boilers and Pressure Vessels Regulation*.

Other Safety Codes Act non-compliance issues that should be reported to an ABSA Safety Codes Officer include: pressure equipment designs not registered, construction servicing or repair activities done by an organization who does not have the required Alberta Quality Program Certificate of Authorization, inspection and servicing intervals assigned that exceed the maximum interval established in the ISR, or pressure equipment relief devices set above the MAWP.

Requirements for reporting accidents and unsafe conditions are posted on the ABSA website at [www.absa.ca](http://www.absa.ca).

## APPENDIX A

### Typical Manual Format

An example of a manual section layout is shown below for an upstream owner-user who uses contract engineering organizations for the detailed design engineering.

### **DESIGN CONTROL**

#### Purpose

To ensure that pressure equipment designs meet all requirements of the Safety Codes Act, and that pressure equipment is designed to prevent the unintentional release of contained fluid and meets operational and other end-user requirements.

#### General

All project engineering and maintenance engineering support is coordinated through the head office.

Detailed design documents are prepared by engineering contractors who have been approved per Section 2.11 of this manual.

Engineering activities done at plant facilities are restricted to routine piping and fitting replacement in accordance with existing design specifications.

Project files are maintained at the head office and a copy is retained at the site offices.

Maintenance engineering files and current copies of drawings, P & IDs, and other drawings are maintained at the site offices.

Contract engineering organization's specifications and drawings are used for head office controlled projects.

Standard piping specifications are available to the head office and site personnel online and are used for maintenance projects.

### **Responsibilities**

The facilities engineering manager is responsible for ensuring that the requirements defined in this section are followed for all in-house and contract engineering activities. The facilities engineers are responsible for coordinating all project activities and for providing the engineering support to site facilities.

#### Key Activities:

- Preparation and provision of the design, operation, and other information needed to form the basis for the detailed design documents (Design Basis Memorandum (DBM)).

- Verifying that personnel assigned to design engineering activities are competent and meet the applicable referenced code experience and qualifications requirements.
- Preparation and approval of design documents - specifications, drawings (P&IDs, Process Flow Diagrams, calculations etc., from the DBM).
- Ensuring that the latest code edition and addenda of the applicable codes and standards and other related documents are available to design personnel and are used.
- Verifying that designs have been submitted to ABSA as required by the Act.
- Ensuring that all design documents including any revisions have the required approval, and that the latest versions are available and used.
- Retention of all applicable design engineering documents.
- Ensuring that drawings such as process flow diagrams, and P&IDs reflect as-built condition, are kept current and are available at their points-of-use.
- Ensuring that there is appropriate management of change processes in place for all design activities.
- Verifying that manufacturers and piping contractors are qualified and competent to construct pressure equipment in accordance with the design requirements.
- Ensure that any personnel designated to perform owner inspector duties under the B31.3 piping code are competent and meet the required experience and qualification requirements.

**Applicable Documents (Posted on line system OLS)**

Document Control Procedure No. XXX  
ABC Piping Design Specifications No. XXX  
Project control Flowchart No. XXX

**Revision Log**

Rev #	Date	Description
1	2007-07-25	<p>Removed reference to Boiler and Pressure Vessel <b>Repair and Alteration</b> Matrix AB-504 on page 32. The AB-504 Boiler and Pressure Vessel <b>Repair and Alteration</b> Matrix document has been rescinded. The AB-504 described responsibilities for reviewing repair and alteration procedures and the scope of inspection and certification of repairs that can be done by owners under their Alberta Owner-User Certificate of Authorization. These responsibilities are now described in the AB-513 Pressure Equipment Repair and Alteration Requirements document.</p>
2	2007-10-22	Added a revision log