Requirements for Alteration Design Registration Based on Fitness-for-Service

AB–535

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FOREWORD

As provided for under Section 40 of the Pressure Equipment Safety Regulation, the Administrator in the pressure equipment discipline has established that ABSA document AB-535 “Requirements for Alteration Design Registration Based on Fitness-for-Service” provides guidelines and specifies requirements that must be met for registration of a Fitness-for-Service alteration design.

The Next reaffirmation of the AB-535 is scheduled for 2031.

1.0 INTRODUCTION

ABSA has issued documents such as AB-506 and AB-513, which both discuss the use of Fitness-for-Service (FFS) assessments when pressure equipment is found to be damaged during in-service operation or found to no longer comply with the original code of construction. The general expectation is that pressure equipment will be

a) repaired, altered (de-rated), or taken out-of-service
b) Alternatively, a Fitness-for-Service (FFS) assessment may be considered to justify the continued use of the pressure equipment without repairing the damage or altering the operating conditions. Design registration is required when FFS is to be used for this purpose.

The requirements in this document are based on the application of API 579-1/ASME FFS-1 *Fitness for Service*. API 579-1/ASME FFS-1 is an industry-recognized standard that provides detailed assessment procedures for specific types of damage and flaws in in-service pressure equipment. It may be considered as an alternative standard for the evaluation of in-service pressure equipment in the context of Section 23 of the Pressure Equipment Safety Regulation. Fitness-for-Service assessments may be used as part of an FFS alteration design. An FFS alteration design, when accepted by ABSA, may be used by the owner to permit pressure equipment that is not compliant with the original registered design to remain in service under certain conditions that will provide for safe operation of the pressure equipment.

FFS alteration designs shall be submitted by the owner to ABSA Design Survey for review and registration with the Design Registration Application form AB-31 and all required pertinent documents. ABSA Design Survey acceptance and registration of the FFS alteration procedure design is a mandatory requirement for continued use of the pressure equipment.

As Fitness-for-Service assessments are complex and multidisciplinary in nature, the involvement of a Professional Engineer in accordance with Section 9 of the PESR is a mandatory requirement.

This ABSA requirements document was developed through close cooperation with pressure equipment owners, FFS specialists and other stakeholders. Their input has been invaluable in compiling this document.

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

Please provide your comments to:
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2.0 DEFINITIONS AND ACRONYMS

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

***ABSA Design Surveyor* –** is an ABSA Safety Codes Officer (SCO) who holds the required Safety Codes Officer designation and designated powers under the Safety Codes Act and is competent to assess that the design of pressure equipment complies with the Alberta Regulations and Code of construction requirements.

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

***Accepted by the owner* –** means that the owner, through a person(s) with appropriate authority and competence, has reviewed the applicable document or information, confirmed that it is applicable to the identified pressure equipment and intended service, and formally acknowledged responsibility for its use and implementation.

***Alteration* –** means any change to an item of pressure equipment, as described in the original manufacturer's data report, which requires a change of design calculations or otherwise affects the pressure-containing capability of the item of pressure equipment. [PESR 1(1)(d)]

Non-physical changes such as a change in the maximum allowable working pressure or design temperature of a boiler or pressure vessel pressure retaining item are considered alterations, as are reductions, such as reduction in minimum temperature.

***Certificate of Authorization Permit (CAP)* –** means a permit issued pursuant to section 44 of the Act authorizing a person to carry out the activities stated on the certificate of authorization permit. [PESR 1(1)(g)]

***Damage mechanism* –** any type of deterioration encountered that can result in flaws or defects that can affect the integrity of pressure equipment; for example, corrosion, cracking, erosion, dents, and other mechanical, physical, or chemical impacts.

***Design* –** includes plans, diagrams, drawings, and specifications depicting the arrangement and operation of any thing, process, or activity to which the Safety Codes Act applies. [SCA 1(1)(j)]

***Fitness-for-service* –** quantitative engineering evaluations that are performed to demonstrate the structural integrity of an in-service component that may contain a flaw or damage.

> **Note 1:** Fitness-for-Service assessments shall be based on the latest edition of API 579-1/ASME FFS-1.

Note 2: For the purpose of this document and whenever Fitness-for-Service assessments or the acronym FFS is used within this document, it shall be understood that they are used only in a context as part of FFS alteration procedure design.

FFS Alteration – means an alteration to pressure equipment based on Fitness-for-Service and that is subject to specific conditions.

Note 1: The FFS Alteration is an applied, comprehensive procedure for ensuring safe operation/service of damaged pressure equipment based on an FFS assessment, in accordance with AB-506, AB-513 and API 579/ASME FFS-1, in order to provide an acceptable level of integrity.

Non-progressive damage – a flaw, deformation, or condition resulting from a past event that, based on documented engineering evaluation, is not expected to increase, propagate, or recur during the defined period of continued service under the specified operating and loading conditions.

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

Owner's designated agent – means the person designated to act as a liaison between ABSA and Owner's organization for the purpose of design registration application.

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

PESR – means Pressure Equipment Safety Regulation (AR 49/2006).

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 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)]

For the purpose of this document, pressure piping system refers to the piping and piping system constructed to ASME B31 Piping Codes or CSA Z662 Pipeline codes.

Pressure Vessel – means a vessel used for containing, storing, distributing, processing or otherwise handling an expansible fluid under pressure. [PESR 1(1)(cc)]

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

Professional Engineer – In this document, a reference to a professional engineer means a professional engineer as defined in the Engineering and Geoscience Professions Act. [PESR 1(2)]

Public Occupancy – means any facility where members of the general public are likely to be present. This would include schools, offices, shopping malls, stores, arenas, pools, restaurants, hotels, etc.

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)]

QP – means Quality Plan Requirements.

Registered Design – means a design as defined in the Safety Codes Act and registered in accordance with the PESR Section 14.

Note: For existing pressure equipment, this includes its original registered design and any registered modification, repair, or alteration designs made to it.

Repair – work necessary to restore an item of pressure equipment to a safe and satisfactory operating condition, provided that there is no deviation from the original registered design.

Note: “Original design” includes previously registered design alterations.

ReRate – A change in the design temperature rating, the minimum design metal temperature, or the maximum allowable working pressure of an item of pressure equipment.

Risk Assessment – means a comprehensive and systematic process of evaluating the potential risks to people, environment, and property that may be a result of operating the pressure equipment.

Root Cause Analysis – means an investigation to determine the source or reason for the damage mechanism(s) that produced the deterioration/flaw in the pressure equipment.

3.0 SCOPE, INTENT, AND LIMITATIONS

a) The scope of this document covers FFS alteration design registration based on a Fitness-for-Service assessment, as required by AB-513 and AB-506, in accordance with the PESR.

b) The intent of this document is to provide guidance for the owner in regard to design submission requirements, whenever registration of an FFS alteration design is pursued.

c) The FFS alteration design registration application may be considered for damaged pressure equipment assessed using the current edition of the Fitness-for-Service standard and is limited to owner-users who have a valid PEIMS accepted by ABSA.

d) Other owners who demonstrate to ABSA Inspection SCO that they have the equivalent ability to safely operate, monitor, and maintain integrity of pressure equipment subject to FFS alteration may be considered.

3.1 Principles for Use of Fitness-for-Service Assessment

The use of the Fitness-for-Service Assessment may be considered for conditional continued service of damaged and/or flawed equipment based on the following principles:

a) The flaw type, applicable damage mechanism or mechanisms, and credible failure modes have been identified with sufficient confidence to select an applicable FFS assessment procedure and evaluate anticipated damage progression during the proposed service interval.
b) There is a valid reason for not performing repairs or re-rating.
c) The determination that the equipment has an acceptable level of integrity for the continual service interval based on Fitness-for-Service Assessment.
d) The risk of operating the damaged pressure equipment has been evaluated and accepted by the owner.
e) The owner has a comprehensive process in place during the continual service to provide for appropriate and acceptable management of the risk(s) and safe operation of pressure equipment.
f) The risk of operating pressure equipment subject to FFS alteration design shall be managed by implementation of appropriate technical and administrative procedures. The risk management shall provide for acceptable level of integrity during the service timeframe.
g) The Fitness-for-Service Assessment shall include a specified plan for the permanent resolution of the defect/flaw, and it shall provide a detailed monitoring and risk management plan to ensure continued and safe operation. The monitoring plan shall define all pertinent variables and corresponding acceptance criteria.

h) The owner has detailed documentation and record keeping systems, maintenance, and monitoring programs and all other required activities to ensure for the safe, continual operation of the equipment or the component.
i) The pressure equipment subject to the FFS alteration design may be in continued, conditional service only if the service conditions are not changed.

The FFS assessment shall be based on the identified flaw type, applicable damage mechanism or mechanisms, credible failure modes, inspection data, and anticipated operating conditions. The assessment shall address all identified active, potential, and interacting damage mechanisms that could affect the validity of the assessment or the proposed period of continued service.

3.2 Fitness-for-Service Limitations

3.2.1 Fitness-for-Service Assessment Limitations

Fitness-for-service assessments shall **not** be considered for the following:

a) pressure equipment in public occupancy service
b) pressure relief devices or flanged joints connecting a pressure relief device
c) new construction of pressure equipment
d) for the purpose of re-rating (up-rating of in-service pressure equipment)
e) when the allowable number or type of operating cycles specified in the registered FFS alteration has been reached; or
f) when an operating transient occurs that was not considered in the registered FFS assessment.

3.2.2 FFS Alteration Limitations

a) When FFS alteration design registration includes acceptance for a limited and pre-defined period of time, the registration expires when any of the following is applicable:

   i. the pre-defined period of time has passed
   ii. the monitoring system indicates that the monitored variable (e.g., thickness, crack depth, etc.) is outside of the acceptance criteria
   iii. the service conditions are changed

b) FFS alteration design registration becomes void when equipment is sold, relocated, or re-rated.

For the limitations identified above, the owner may make a submission to re-register the FFS alteration design based on conditions that are current at the time.

Informative Annex A provides some additional guidance on the continued use of equipment for which the FFS alteration design has become void.

3.2.3 Cyclic-Service and Fatigue-Limited Pressure Equipment

a) An FFS alteration may be considered for pressure equipment where fatigue, creep-fatigue, or another cycle-dependent failure mode was included in the original registered design.

b) An FFS alteration may be considered where:

   i. damage or deterioration is identified before the allowable number of design cycles has been reached; or
   ii. continued service is proposed after the equipment has reached or is approaching the cyclic-service limit established by the registered design.

c) An FFS alteration shall not be used solely to disregard, reset, or administratively extend the cyclic life established by the registered design.

d) The original registered design, including its fatigue evaluation, design transients, allowable cycles, operating limits, and applicable construction-code requirements, shall remain part of the technical basis for the FFS assessment.

e) The FFS assessment shall establish an allowable remaining service life expressed in cycles and, where applicable, calendar time. The assessment shall consider, as applicable:

   i. the original fatigue or creep-fatigue design basis;
   ii. the actual operating and transient history;
   iii. the number, type, magnitude, sequence, and frequency of accumulated cycles;
   iv. differences between actual and originally specified operating transients;
   v. inspection findings and the current condition of the equipment;
   vi. cumulative fatigue damage and interaction with other flaws or damage mechanisms;
   vii. projected future operating conditions and cycles; and
   viii. uncertainties in operating, inspection, material, or cycle-history information.

f) Where the operating or cycle history cannot be established with reasonable confidence, conservative assumptions shall be used and justified by the Professional Engineer.

g) The registered FFS alteration shall specify:

i. the allowable remaining number and types of cycles;
ii. applicable operating and transient limits;
iii. inspection, monitoring, and reassessment requirements;
iv. conditions requiring shutdown, repair, replacement, or further assessment; and
v. the expiration date or other applicable service-life limitation.

h) The owner is responsible for maintaining cycle records, controlling operating conditions and transients, implementing the registered monitoring and inspection requirements, and ensuring that the equipment is repaired, replaced, removed from service, or reassessed before any registered limit is reached.

i. Registration of an FFS alteration does not transfer responsibility for the design-life management or safe operation of the pressure equipment from the owner to ABSA.

3.2.4 Non-Progressive Damage and Permanent Deformation

An FFS alteration design may be considered for permanent or apparently non-progressive damage, including distortion or out-of-roundness caused by vacuum, external pressure, overpressure, mechanical loading, or thermal events.

The condition shall be supported by a documented engineering assessment that:

a) identifies the cause and confirms it has been eliminated, controlled, or is unlikely to recur;
b) documents the as-found geometry and any associated damage;
c) evaluates structural integrity using the actual deformed geometry, applicable loads, operating conditions, and credible failure modes;
d) establishes operating limits, monitoring requirements, acceptance criteria, and mitigation measures; and
e) demonstrates that the condition will remain stable during the proposed service period.

The absence of observed change alone is not sufficient to classify damage as non-progressive.

Where FEA is used, CSA B51 Annex J and AB-520 shall also be followed. Damage that cannot be demonstrated to remain stable shall not be accepted for continued service as non-progressive damage.

For equipment containing permanent deformation or other non-progressive damage, the monitoring plan shall include a method for confirming that the condition remains stable. The plan shall specify baseline measurements, monitoring locations, inspection methods, inspection intervals, dimensional tolerances, acceptance criteria, and actions required when any change is detected.

3.3 Interaction with Risk-Based Inspection

Risk-Based Inspection and Fitness-for-Service are complementary integrity-management activities but serve different purposes.

Risk-Based Inspection is used to establish and manage inspection plans based on the probability and consequences of failure. Fitness-for-Service is an engineering assessment used to determine whether pressure equipment containing a known flaw or damage has an acceptable level of integrity for continued service under defined conditions.

The following requirements apply:

a) An RBI assessment or inspection plan shall not replace an FFS assessment where FFS alteration is used or required to justify continued operation of damaged pressure equipment.
b) The existence of an RBI program does not remove the requirement to register an FFS alteration design in accordance with this document, unless the alteration is managed under an accepted FFS Quality Plan.
c) Where pressure equipment subject to an FFS alteration is included in an RBI program, the applicable FFS conclusions, assumptions, limitations, and conditions shall be incorporated into the RBI program and the owner's PEIMS.
d) The RBI inspection plan shall address, as applicable:
    i. the identified flaw and damage mechanism;
    ii. credible failure modes;
    iii. applicable damage or crack-growth rates;
    iv. remaining-life limitations;
    v. required inspection techniques and examination coverage;
    vi. monitoring locations and variables;
    vii. inspection and monitoring intervals;

viii. acceptance criteria and action limits; and
ix. operating limits and conditions established by the FFS alteration design.

e) An RBI program shall not be used to extend an inspection or monitoring interval beyond the interval established by the registered FFS alteration design unless the FFS assessment is appropriately re-evaluated and, where required, the alteration design is revised and re-registered.
f) Where there is a conflict between the RBI inspection plan and a condition of the registered FFS alteration design, the more conservative requirement shall apply until the matter has been resolved through an engineering assessment and, where applicable, acceptance by ABSA.
g) Changes to the damage mechanism, operating conditions, process conditions, inspection findings, deterioration rate, remaining-life assumptions, or risk ranking shall be reviewed through the owner's management-of-change process. The review shall determine whether the FFS assessment, RBI plan, monitoring requirements, or registered FFS alteration design must be revised.
h) Inspection information obtained through an RBI program may be used in an FFS assessment, provided that the inspection techniques, examination coverage, data quality, and personnel competencies satisfy the requirements of the applicable FFS assessment procedure.

4.0 GUIDELINE FOR FFS ALTERATION DESIGN

a) All of the below-listed elements are considered minimum and are essential for comprehensive FFS alteration design registration application.
b) It is important to understand that the listed considerations may not be sufficient to address all specifics of all possible variations of use of an FFS alteration. Additional consideration may be necessary for proper development of FFS alteration design to ensure the owner will provide for safe operation of the subject pressure equipment.
c) Whenever the submitter deems that some of the above considerations may not be applicable, the submitter may provide clarification and rationale for non-consideration to help efficient processing of the application.

4.1 Developing an FFS Alteration Design

The development of FFS alteration should generally include the following stages:

a) Condition characterization, including flaw and damage mechanism identification;
b) FFS assessment to determine whether the equipment is acceptable for consideration for conditional continued service;

c) Procedures development — operational, maintenance, inspections, and other needed procedures to provide for acceptable level of integrity during the service timeframe, and
d) permanent-resolution procedures, such as permanent repair, alteration or replacement of the equipment, as applicable.

4.2 FFS Alteration Design Registration

4.2.1 Submitting a Design Registration Application

As indicated in ABSA documents AB-506, Section 13, and AB-513, Section 8.3, an FFS alteration design proposal shall be submitted to ABSA's Design Survey department for survey and registration by an ABSA SCO.

Completed Design Registration Application by using the AB-31 form and including all required documents and information may be submitted to ABSA's Design survey by either of the following:

a) the owner
b) the owner's designated agent (with the concurrence of the owner)

4.2.2 QP for FFS Alteration Design

Alternatively, to Submitting a Design Registration Application, an owner user may develop a Quality Program in accordance with Annex B of this document. The use of Annex B is limited to FFS Alteration based on Level 1 and/or Level 2 FFS assessments.

4.3 Documentation considerations for an FFS Alteration Design Registration Application

As a minimum, the following information/documents should be submitted for an FFS alteration design registration application in order to be considered for survey and registration:

1) Design Registration Application — form AB-31 (completed)
2) Equipment identification
3) Most relevant inspection report
4) Flaw or damage mechanism identification
5) Owner's reasoning/justification for using the Fitness-for-service assessment (acceptable to ABSA)
6) Fitness-for-Service assessment
7) Root cause analysis, where required
8) Monitoring and Maintenance plan
9) Action Plan and/or Mitigation Procedures (as applicable)

10) Contingency plan or emergency procedures (as applicable)
11) Timeline and plan for permanent resolution (as applicable)
12) Owner statement

Note: SCO-Design Surveyor may request additional information if deemed necessary, as provided by PESR.

4.3.1 Design Registration Application Form

This is a completed form AB-31. The form is available on the ABSA web site: www.absa.ca.

4.3.2 Equipment Identification

It is essential that the following information, as applicable, be included in the document describing the equipment:

a) serial number
b) owner's identification number(s)
c) CRN number(s) or PP number
d) "A" number(s)
e) design conditions
f) past repair/alteration details
g) past and current operating conditions (as applicable)
h) continued service operating conditions
i) other loading conditions (other than pressure/temperature, for example, see UG-22)
j) other pertinent information
k) original cyclic-service or fatigue design basis, including specified design transients and allowable cycles, where applicable
l) documented actual cycle and transient history
m) projected future cycle and transient conditions

Note: The owner shall sign such a document.

4.3.3 Inspection Report and Owner's Reasoning

4.3.3.1 Most Relevant Inspection Report

a) The owner is responsible for determining the applicable and appropriate inspection and testing techniques.
b) The inspections and testing performed shall provide all relevant information for determining the condition of the vessel and may be used as part of the Fitness-for-Service assessment and development of the FFS alteration design.
c) The Inspection report must be accepted by the Owner.

d) The inspection report and its acceptance shall be documented and submitted as part of the design registration application.

4.3.3.2 Owner's Reasoning/Justification for Using the Fitness-for-Service Assessment

a) This may be formatted as a written document and is needed in order to provide details of the owner's proposed reasoning/justification for using Fitness-for-Service assessment (as part of the FFS alteration design).
b) The rationale shall be based on valid technical and safety considerations.
c) The rationale shall provide for an alternative equivalent level of personnel, property, and environmental safety.
d) The rationale shall clarify why this would be a better option than repairing, re-rating, or replacing the pressure equipment.
e) The rationale shall provide for an acceptable level of integrity for safe operation of pressure equipment subject to the Fitness-for-Service assessment (as part of the FFS alteration design).

Note: Such a document shall be signed by the owner.

4.3.4 Flaw Characterization and Damage Mechanism Identification

Before an FFS assessment procedure is selected or applied, the owner shall ensure that the observed flaw or damage is characterized and that the applicable damage mechanism or mechanisms and associated credible failure modes are identified and documented.

The characterization and identification shall address, as applicable:

a) the flaw type, location, dimensions, orientation, distribution, and extent;
b) the physical, chemical, mechanical, metallurgical, or other deterioration process affecting the pressure equipment;
c) whether the damage mechanism is active, potentially active, inactive, or non-progressive under the proposed operating conditions;
d) the associated credible failure modes; and
e) the potential interaction between multiple flaws, damage mechanisms, or failure modes.

The assessment shall be supported, as applicable, by:
a) inspection and examination results;
b) operating and process history;
c) past, current, and anticipated operating conditions and transients;

d) material, fabrication, and design information;
e) previous inspection, repair, alteration, or failure history; and
f) other relevant technical information.

The identified flaw type, damage mechanism, and credible failure modes shall form the basis for:

a) selection of the applicable API 579-1/ASME FFS-1 assessment procedure;
b) selection and qualification of inspection techniques and examination coverage;
c) determination of applicable deterioration, crack-growth, or damage-accumulation rates;
d) evaluation of remaining life and anticipated damage progression;
e) establishment of monitoring intervals, acceptance criteria, and action limits;
f) development of mitigation measures; and
g) development of the permanent resolution plan.

Where more than one damage mechanism is credible, all applicable mechanisms and their potential interactions shall be evaluated unless excluded by documented technical justification.

Where the flaw type or damage mechanism cannot be identified with sufficient confidence to select an applicable assessment procedure and evaluate anticipated damage progression, an FFS assessment shall not be used to justify continued operation. Additional inspection, testing, process review, material evaluation, analysis, or engineering investigation shall be completed before proceeding.

The flaw characterization and damage mechanism identification shall be accepted by the owner and included in the Design Registration Application.

4.3.5 Fitness-for-Service Assessment

It is intended that the Fitness-for-Service assessment document is based on the API 579-1/ASME FFS-1 (latest Edition) Fitness-for-Service Standard. In this Fitness-for-Service Standard, the engineer will find detailed procedures for evaluating many different types of flaws and damage mechanisms. As discussed elsewhere in this document, the FFS assessments described in the API 579-1/ASME FFS-1 can indicate whether the pressure equipment may be suitable for continual service with the current operating conditions.

Continual service may be permissible, subject to conditions and provided suitable monitoring, inspection, and other safety related programs are

established. If the FFS assessment indicates that the equipment is not suitable for the current operating conditions, then the equipment shall be re-rated, repaired, or retired (removed from service).

API 579-1/ASME FFS-1 is organized around flaw types and damage mechanisms. The engineer shall take into consideration the damage noted by the inspections and consider the appropriate flaw type(s).

The FFS assessment shall be based on the flaw characterization and damage mechanism identification completed in accordance with Section 4.3.4. All identified credible damage mechanisms, associated failure modes, and potential interactions shall be addressed in the assessment.

The inspection type used shall be appropriate and capable of accurately categorizing the damage mechanism and measuring the extent of damage.

For cyclic-service or fatigue-limited pressure equipment, the FFS assessment shall address the original fatigue design basis, accumulated fatigue usage, actual operating transients, remaining allowable cycles, projected future operation, and all applicable fatigue or creep-fatigue damage mechanisms. The assessment shall clearly identify the revised service-life limits and shall not represent the remaining life as unlimited.

4.3.5.1 FFS Assessment Procedure

The general approach to performing an FFS Assessment is described in API 579-1/ASME FFS-1 (latest Edition) in Part 2, §2.1.3. The general outline of that section is listed below with some additional commentary. The engineer is advised to refer to the details in the Fitness-for-Service Standard. All applicable steps shall be followed and included in the documentation.

a) STEP 1 — *Flaw Characterization and Damage Mechanism Identification:* Confirm the flaw characterization and damage mechanism identification completed in accordance with Section 4.3.4.
b) STEP 2 — *Applicability and Limitations of the FFS Assessment Procedures:* The applicability and limitations of an analysis procedure are stated relative to the level of assessment. If the assessment procedure indicates that it is appropriate for components not in creep service, then the limits in Table 4.1 of API 579-1/ASME FFS-1 (latest Edition) shall be used to make that determination.
c) STEP 3 — *Data Requirements:* Data requirements specific to a damage mechanism or flaw type are

covered in the Part of API 579-1/ASME FFS-1 (latest Edition), which contains the corresponding assessment procedures. All NDE reports shall be included in the documentation. It is the engineer's responsibility to ensure that the inspection data used is suitable for the assessment performed, as described in each Part.

d) STEP 4 — *Assessment Techniques and Acceptance Criteria:* Three levels of assessment are provided in each part. The level of conservatism in the evaluation techniques decrease for Level 2 and Level 3 analysis as a result of the requirements of a more detailed inspection and more sophisticated evaluation methods.

   i. *Level 1 Assessment:* The assessment procedures included in this level are intended to provide conservative screening criteria that can be utilized with a minimum amount of inspection or component information.
   ii. *Level 2 Assessment:* The assessment procedures included in this level are intended to provide a more detailed evaluation that produces results that are more precise than those from a Level 1 assessment. In a Level 2 assessment, inspection information similar to that required for a Level 1 assessment is needed; however, more detailed calculations are used in the evaluation.
   iii. *Level 3 Assessment:* The assessment procedures included in this level are intended to provide the most detailed evaluation, which produces results that are more precise than those from a Level 2 assessment. In a Level 3 assessment, the most detailed inspection and component information is typically required, and the recommended analysis is based on numerical techniques, such as the finite element analysis (FEA), or experimental techniques (when appropriate). Failure modes listed in §2D.1.4 of API 579-1/ASME FFS-1 (i.e. plastic collapse, local failure, collapse from buckling, creep or creep-fatigue damage, fatigue damage) shall be analyzed using the assessment procedures provided, with the associated margins described. When numerical techniques such as FEA are used, ABSA document AB-520 shall also be followed.

e) STEP 5 — *Remaining Life Evaluation:* Remaining life estimates typically fall into one of the following categories:

i. Remaining Life Can Be Calculated with Reasonable Certainty
ii. Remaining Life Cannot Be Established with Reasonable Certainty
iii. There Is Little or No Remaining Life

f) STEP 6 — *Remediation*
g) STEP 7 — *In-Service Monitoring:* In-service monitoring is used to assess damage growth and reassess the remaining life. Where the degradation rate is uncertain, frequent in-service monitoring would be required.
h) STEP 8 — *Documentation:* In addition to the documentation requirements listed in API 579-1/ASME FFS-1 (latest Edition), the requirements of this document shall also be followed.

4.3.5.2 FFS Acceptance Criteria

The acceptance criteria list in §2.4.2 of API 579-1/ASME FFS-1 (latest Edition) shall be followed, as applicable. The descriptions below are supplementary to those provided in API 579-1/ASME FFS-1. Each of the FFS assessment methodologies presented in API 579-1/ASME FFS-1 utilizes one or more of the following acceptance criteria.

a) Allowable Stress: The allowable stress is typically a function of the original Code of Construction. The Edition and Addenda of the original code of construction shall be used to determine the allowable stress.

Note: Some specific materials have lower allowable stress values today than per original code of construction. Special consideration and appropriate values of allowable stress shall be used in such situation.

b) Remaining Strength Factor: The allowable remaining strength factor (RSFa) that can be used for an assessment shall not be less than 0.9.
c) Failure Assessment Diagram: The Failure Assessment Diagram (FAD) is used for the evaluation of crack-like flaws in components. The recommended minimum allowable value for the in-service margin is set at 1.0.

4.3.5.4 Competency

The owner is responsible for ensuring that the engineers, technologists, and technicians performing the inspection and engineering assessments are suitably competent.

As Part of the Owner's Statement in 4.3.11 in this document, it is required to include a statement accepting the competence of the engineers, technicians, and technologists performing the inspection and engineering assessments.

4.3.5.5 Certification

The final engineering Fitness-for-Service Assessment document (as detailed in the above paragraphs in 4.3.5 of this document) shall be certified/stamped by a Professional Engineer.

4.3.5.6 Risk Assessment

The owner shall provide a comprehensive and systematic process of evaluating all potential risks to people, environment, and property that may be affected as a result of operating the pressure equipment.

The following questions should be considered (but not be limited to) in the Risk Assessment:

a) How are (will) the operating conditions (be) controlled?
b) Which operating transients occurred in the past, and how have they affected the damage mechanisms?
c) How may a potential failure of other equipment affect the normal operation of the pressure equipment in question?
d) How will the owner address the responsibility for establishing the criteria for retiring pressure equipment?
e) What are the permanent resolution plans?
f) What is the confidence level in the inspection performed?
g) Were the best suitable techniques and competent technicians selected?
h) What are the consequences of failure?
i) What is the potential to introduce new failure modes or damage mechanisms?

The owner shall provide a summary risk assessment document and a statement that they accept the risk related to continual operation of pressure equipment subject to the FFS alteration. The summary document should describe the probability, consequences, and mitigations of a potential failure of the pressure boundary.

4.3.6 Root Cause Analysis

Damage mechanism identification and root cause analysis are related but distinct activities. Damage mechanism identification determines the deterioration process affecting the pressure equipment and is required as a basis for the FFS assessment.

A root cause analysis shall be performed where necessary to:

a) determine why the damage occurred;
b) support the development of effective mitigation measures;
c) prevent recurrence of the damage;
d) validate assumptions concerning future damage progression;
e) support the monitoring, maintenance, or permanent resolution plan; or
f) satisfy the owner's PEIMS requirements or a request from ABSA.

Where mitigation of the damage mechanism is credited as part of the FFS alteration design, the root cause relevant to the proposed mitigation shall be identified with sufficient confidence to demonstrate that the mitigation will be effective.

Where a complete root cause analysis cannot reasonably be completed at the time of the initial application, the submission shall identify:

a) the preliminary findings;
b) the remaining uncertainties;
c) the interim operating, inspection, monitoring, and risk-control measures;
d) the person responsible for completing the investigation; and
e) the required completion date.

The FFS alteration design shall not rely on unverified mitigation measures or assumptions that the damage mechanism has been eliminated.

The root cause analysis report, or the documented plan for its completion, shall be submitted as part of the Design Registration Application and shall be accepted by the owner.

4.3.7 Monitoring and Maintenance Plan

A detailed maintenance and monitoring plan of the pressure equipment shall be developed, documented, and supplied to ABSA.

Elements, as applicable, to be addressed shall include (but not be limited to) the following:

a) defined frequency and extent of intermittent inspections or recordings
b) process monitoring
c) record keeping
d) inspection techniques
e) method for identifying, classifying, counting, validating, and retaining records of operating cycles and transients
f) defined action limits for accumulated cycles, fatigue usage, or unanticipated transients
g) requirements for reassessment following an operating transient outside the assessed operating envelope

4.3.8 Action Plan and/or Mitigation Procedures

A detailed Action Plan and/or Mitigation procedure regarding the damage mechanism shall be developed, documented, and submitted to ABSA.

a) It is required that a documented Action Plan be implemented by the owner to address the planned activities for re-evaluating the damage mechanism, monitoring deterioration, and other pertinent activities.
b) When mitigation of the damage mechanism is to be implemented, a detailed Mitigation Procedure is developed that documents all planned activities for eliminating or reducing the effects of the damage mechanism to acceptable levels.

4.3.9 Contingency Plan or Emergency Operating Procedures

A contingency plan for dealing with any unexpected safety situations shall be developed. Included in the plan shall be a description of the operational steps to bring the equipment to a safe state (e.g., shutdown, pressure reduction) in the event that an unanticipated failure or other safety hazards of the operating of the equipment occurs. It shall be considered a failure if the pressure equipment is a credible risk scenario. The owner-user of the pressure equipment may have emergency operating procedures for credible risk scenarios, and those may be complex internal operating procedures. The owner is responsible for reviewing the existing emergency operating procedures as well as confirming and accepting that

the already existing emergency operating procedures are sufficient for managing the risks.

The owner may do one of the following:

a) The owner can develop a specific Contingency Plan. The summary of the Contingency Plan shall be submitted and include a statement of the commitment from the owner.
b) Optionally, rather than submitting a specific Contingency Plan a statement can be included in the owner's statement that indicates they have existing emergency operating procedures that are sufficient for managing credible risks associated with the subject pressure equipment.

4.3.10 Timeline and plan for permanent resolution

a) The owner shall prepare and provide a documented, detailed timeline and plan for repair, re-rate or replacement of the pressure equipment, subject to the FFS alteration. This shall be based on a reasonable and acceptable pre-defined period of time.
b) If there is an acceptable justification for not performing a repair or re-rate, this shall be documented and submitted as part of the design registration application.

4.3.11 Owner's Statement

The owner shall provide to the ABSA SCO-Design surveyor with a separate letter of statement. It is recommended this to be on the owner's letterhead, acknowledging the owner's responsibility for the FFS alteration. As an alternative, this may be provided as a cover letter for the entire documentation application, or a summary form as developed by the owner or ABSA.

The letter should include statements and information to the following intent:

a) The owner accepts the FFS alteration and all risks associated with it.
b) The owner attests to the competence of the engineers, technicians, and technologists performing the inspection and engineering assessments.
c) The owner takes full responsibility for ensuring safe operation of the subject pressure equipment and to develop, implement, and adhere to all plans, procedures, and activities as necessary, in accordance with this document, the registered design, and PESR.

d) The title and the position of authority (within the Owner Management System) of the person signing the document shall also be included.
e) For cyclic-service pressure equipment, the owner accepts responsibility for maintaining reliable cycle and transient records, controlling operation within the registered limits, and repairing, replacing, removing, or reassessing the equipment before the allowable remaining service life is exhausted.

4.4 Survey and registration of FFS Alteration Procedure

Based on the design registration application, the ABSA SCO-Design surveyor may consider registration of the design of the FFS Alteration Procedure.

Following the survey ABSA SCO-Design surveyor may do any of the following:

a) accept the proposed design as submitted
b) accept the proposed design with modified conditions
c) reject the proposed design and provide reasons for rejection

5.0 RECORD KEEPING

a) The owner shall keep the record for any use of the FFS Alteration Procedure and a detailed FFS assessment until the pressure equipment is permanently repaired, re-rated, or removed from service.

b) The records shall be available during ABSA audits.

Note: The FFS Alteration record shall include all pertinent, documented information as required per API 579-1/ASME FFS-1 (latest Edition), this document, and PEIMS of the owner.

6.0 ANNEX A (INFORMATIVE)

Continued Use of Pressure Equipment Subject to FFS Alteration limitations

When the owner considers that the continual use of the pressure equipment subject to the FFS alteration design and the limitation set in Par. 3.2.2 of this document are reached, the owner may apply the following options:

a) Perform Repair or re-rate to the subject pressure equipment:
Repair/alteration design procedure registration with ABSA Design Survey using the AB-31 form may be required, under the condition the owner does the following:

1) provides all pertinent details for the design and repair/alteration (re-rate) activities
2) ensures a new AB-40 form is completed and signed by the ABSA SCO-Field Inspector

b) Re-evaluate the existing FFS alteration:
The existing, accepted FFS alteration design and FFS assessment is re-evaluated for the new circumstances and re-registered with ABSA Design Survey using the AB-31 form, under the condition that the owner does the following:

1) accepts responsibility for operating the equipment in a safe manner
2) demonstrates the capacity to comply with the pre-existing conditions and limitations
3) completes a new owner's statement, as required by this document
4) ensures a new AB-40 form is completed and signed by ABSA SCO-Field Inspector, if required.

c) Revise the FFS alteration:
The owner shall revise (modify) the existing FFS alteration design and register it with ABSA Design Survey using the AB-31 form, under the condition that the owner does the following:

1) accepts responsibility for operating the equipment in a safe manner
2) provides details for any new updates and modifications
3) demonstrates capacity to comply with the pre-existing conditions and limitations
4) completes a new owner's statement, as required by this document
5) ensures a new AB-40 form is completed and signed by ABSA SCO-Field Inspector, if required

d) Develop New FFS alteration:

New FFS alteration design is developed and registered with ABSA Design Survey using the AB-31 form, under the condition that the owner does the following:

1) complies with all requirements of this document
2) ensures a new AB-40 form is completed and signed by ABSA SCO-Field Inspector, if required

7.0 ANNEX B - QUALITY PLAN: FITNESS-FOR-SERVICE BASED ALTERATIONS

FOREWORD

Owner-Users may elect to develop a quality program for a FFS Alteration procedure. Such a quality program needs to address the design development, implementation, inspection, documentation, certification, and all other applicable activities for Fitness-for-Service based alterations. The quality program shall be within the scope of an Owner-User's Quality Management System Certificate of Authorization Permit.

By implementing a Quality Plan in accordance with this Annex B as an alternative process to the regular program, the owner-user may be exempted from registration of the FFS Alteration procedure design and FFS alteration certification by an ABSA SCO.

The Owner-User may be permitted to self-manage, document and certify FFS Alterations., Which are subject to the ABSA SCO's quality program acceptance, demonstration of the Quality program effectiveness and continual audit of the Quality program and applied FFS based Alterations.

INTRODUCTION

In cooperation between Industry, the Public and ABSA, work groups have developed and proposed alternate processes for the purpose of administering Pressure Equipment Safety Programs. The intent of such processes is to streamline certain defined activities involving pressure equipment, through the development of process-based plans, and following the principle of quality assurance. Such an alternate process is defined as the Quality Plan (QP). The QP is an enhanced system of procedures intended to maintain the safety of pressure equipment by ensuring that the activities meet the requirements of the Alberta Regulations.

This document outlines the QP requirements for Fitness-for-Service (FFS) based Alterations and shall be read and interpreted in conjunction with AB-535, AB-506, AB-512 and AB-513. Any conflicts between this document and other AB documents shall be resolved in accordance with Section 4.

The FFS QP is an alternate process to streamline FFS Alterations under an Owner-User's CAP. Owner-Users who hold a CAP, may be authorized under their CAP to develop, implement, inspect, certify and document specific FFS Alterations performed at their plant sites.

An Owner-User who voluntarily elects to invest and dedicate resources to develop, implement and maintain a FFS QP in compliance with this document and consequently demonstrates that the objectives of the QP are consistently achieved, may be exempt from a FFS Alteration procedure registration and the alteration certification by a SCO. The FFS QP and outputs from its processes will be subject to acceptance and audits by an ABSA SCO.

The FFS QP is intended to ensure safe continual operation of FFS altered pressure equipment, while minimizing delays in the development and application of a FFS Alteration procedure. This can promote consistency in all FFS activities. Including the following: evaluation, use, monitoring, remediating, reevaluating and record keeping of FFS altered equipment all through the development and effective application of a process-based quality and safety assurance program that meets regulatory codes and standards and Owner-User requirements.

7.1 Definitions and Acronyms

For the purpose of this document, the definitions in

a) SCA *(RSA 2000, Chapter S-1)*,
b) PESR *(Alberta Regulation 56/2006)* and
c) AB series documents: AB-535, AB-506, AB-512, AB-513 are applicable.

The user of this document is responsible for ensuring that they are knowledgeable in the above noted documents and therein identified definitions and acronyms.

7.2 SCOPE

Participation in the FFS QP is voluntary for eligible Owner-Users who hold a CAP and are authorized to inspect and certify FFS based alterations.

The Scope of application of this document is limited to Owner-Users who voluntarily elect to invest and dedicate resources to develop, implement and maintain a FFS QP for the design and implementation of Alteration procedures based on and limited to, level 1 and/or level 2 FFS assessments.

Compliance with this document and demonstration that the objectives of the QP are consistently achieved may provide the Owner-Users with exemption from a FFS Alteration Procedure registration and the Alteration certification by a SCO. The FFS QP and outputs from its processes will be subject to audits by a SCO.

This document (Annex B) establishes requirements that shall be addressed in a FFS QP.

7.3 FFS QP Eligibility

Alberta-based Owner-Users that meet all of the following criteria are eligible to apply for a FFS QP:

a) Maintains a PEIM system in accordance with AB-512.
b) Holds a CAP in accordance with PESR Section 11(3), and AB-513 Par. 6.3 to repair or alter pressure equipment.
c) Develops, implements and maintains procedures that address the requirements of this document.
d) Makes an application to include the FFS Quality Plan in the scope of their PEIM system, as described in this document.
e) Employs or contracts, personnel that meet the competency requirements of their documented FFS Quality Plan process or otherwise provide for control and maintenance of the FFS Quality Plan process.

7.4 SCOPE of the Program

The intent of this document is to provide a regulatory approach for the development of FFS QP's that are based on measurable outcomes, rather than prescriptive process techniques or procedures. The following FFS QP requirements are intended to establish defined safety objectives, results and expectations without specific direction, definition, or codification regarding how those objectives and results are to be obtained or achieved. The FFS QP shall be process-based with verifiable, documented, and auditable procedures that effectively result in the safe operation of pressure equipment subject to FFS alterations.

7.4.1 Responsibilities

ABSA shall administer and audit the FFS QP program.

The Owner-User shall: develop, implement, maintain and continually improve all documents, processes and procedures that form the FFS QP.

7.4.2 FFS QP Requirements

The Owner-User's FFS QP shall be developed to meet the following requirements:

7.4.2.1 Safety Objectives:

a) Create an FFS QP that ensures all FFS based alterations performed under the QP satisfies the requirements of regulations (AB-506, AB-513, AB-535), codes and standards and Owner-User requirements.

7.4.2.2 Results:

a) Maintain safe operation of FFS altered pressure equipment.
b) Minimize delays in the development and application of a FFS alteration procedure.
c) Produce deficiency-free FFS alteration procedures
d) Permit Owner-Users to manage their equipment in a responsible manner by eliminating submission to and review by ABSA the Design Survey Dept. for FFS evaluations included in the scope of the FFS QP.

7.4.2.3 FFS QP Key Elements and Expectations:

a) The FFS QP shall be incorporated into, or referenced in and controlled under the Owner-User PEIMS
b) The FFS QP scope shall be limited to the design and implementation of level 1 and/or level 2 FFS assessments in full compliance with AB-535 and API-579-1 / ASME FFS-1.
c) The scope of assessments performed under the FFS QP shall be clearly defined and include identification of all:
    1) Flaw and damage mechanisms as defined in Table 2.1 of API 579-1 / ASME FFS-1, that may be assessed under the FFS QP.
    2) Types of pressure equipment that may be assessed for each flaw or damage mechanism.
    3) FFS QP activities.
d) The FFS QP scope shall not include FFS based alterations on/with:
    1) Level 3 FFS assessments.
    2) Pressure equipment constructed in accordance with ASME Section VIII Division 2 or Division 3.
    3) Pressure equipment of complex designs that have been assigned an Alberta Limited Design (ALD), or Alternative (ALT) type CRN.
    4) Engineered pressure enclosures (EPE's).
    5) Pressure vessels with EPE's.
    6) Areas of pressure equipment that may interact with EPE's.
    7) Areas of pressure equipment that may interact with hot taps.
    8) FFS evaluations used together with the provisions of AB-535 Section 6.

Note: Where the assessed area is near an engineered pressure enclosure, hot tap, or other local alteration, an engineering assessment shall be performed and shall demonstrate that the FFS condition and the adjacent feature do not adversely affect one another. The assessment shall consider, as applicable, overlapping stress fields, load transfer, deformation, thermal effects, damage mechanisms, crack or flaw growth, and inspection limitations.

7.4.3 Processes and Procedures

The Owner-User shall identify, define, develop, and document the required processes and procedures for all FFS service activities

performed under the FFS QP. The written description of the FFS shall, as a minimum, address the following elements:

a) All elements of the AB-512, as they relate to FFS evaluations
b) Processes and procedures that address the following topics:
   1) Regulatory and ABSA related processes.
   2) Development of FFS alteration procedures fully compliant with AB-535 and AB-513 para. 8.3.
   3) Management of the overall FFS QP
   4) Other processes as identified by the Owner and/or ABSA.

7.5 Defined and Verified Competencies

Competency and training for the personnel involved with the FFS QP shall be addressed in FFS QP and in compliance with AB-512 Section 5.9. Considering Owner-User and regulatory requirements, personnel who perform work under the FFS QP shall ensure that all procedures and process activities meet the quality objective defined in the FFS QP.

In addition to the key deliverables noted in AB-512 Section 5.9, the FFS QP procedures shall address the following personnel assessment, training and certification requirements for each activity and/or process defined in the FFS QP:

a) Define and document competency requirements.
b) Assess and identify competency gaps.
c) Provide required training and maintenance of continual competency.
d) Identify and designate competent personnel.
e) Verify and document the acceptance of the competencies.
f) Document the final acceptance of all activities performed by the designated personnel.
g) Audit the work of the designated personnel to ensure that they act responsibly and follow all procedures and processes.

Note: Each designated person may perform single or multiple activities such as design, application, inspection, monitoring, documentation and any other necessary functions as part of the FFS QP.

7.6 Audit

The FFS QP shall be configured in a manner to be an auditable program. The owner shall develop an internal audit process as required by AB-512 section 4.20 and 5.20. The FFS QP internal audit process shall:

a) Be subject to an Owner-User's internal documented audit process;
b) Be based on defined and measurable audit objectives and evidence that the FFS QP is effective in its ability to consistently produce FFS

Alterations in full compliance with this document and the applicable pressure equipment regulatory requirements;

c) Conform to the PEIM system audit element used to determine the effectiveness of the IMS;
d) Confirm that appropriate and relevant documented evidence of the process and the process activities are available;
e) Confirm that appropriate signatures of the designated personnel involved with the decision making, acceptance, verification and validation of the documented objectives of the procedures are available;
f) Provide input for continual improvement;
g) Be subject to an external audit performed by an ABSA SCO.

7.7 Documents and Records maintenance

The Owner-User shall maintain all FFS QP information (documentation and records).

7.7.1 Information Requiring Maintenance

At a minimum, the following information shall be maintained:

a) FFS QP process and procedures;
b) Output records as required by the FFS QP process and procedures;
c) Documents and records requiring maintenance under the quality program requirements of this document;
d) Records needed for the purpose of verifying:
   i. regulatory compliance and;
   ii. safe operation of pressure equipment subject to the FFS Alteration;
   iii. Log (List) of all FFS Alteration completed;
e) Records for auditing and other specific owner's needs.

7.7.2 Record Maintenance Requirements

At a minimum, documents and/or records retained for maintenance shall:

a) be in a format acceptable to the owner and ABSA;
b) show the required authentication;
c) be protected from unauthorized alteration;
d) be retained until the pressure equipment is permanently repaired, re-rated, or removed from service.

Note: Existing documentation and record procedures may be considered as part of the FFS QP provided that are identified, verified and referenced as part of the documented FFS QP.

7.8 Demonstrated Effectiveness

Owner-Users shall ensure, through demonstration, that the FFS QP is implemented and effective. ABSA is responsible for the development of an external validation procedure to verify the effectiveness of the program through initial demonstrations. If an Owner-User is unable to demonstrate that their FFS QP is effective, an ABSA SCO, on reasonable grounds, may:

a) Request additional demonstration;
b) Request additional audits or;
c) Cancel the program application.

Following a successful initial demonstration, an ABSA SCO will issue a Letter of Recommendation confirming that the FFS QP has been recognized for inclusion in the Owner-User's PEIM system. Once recognized, the FFS QP is subject to regular audits. Regular audits will be performed based on an audit schedule maintained by ABSA. In instances when the scope of the FFS QP program is to be extended, or if the Owner applies major changes to the FFS QP, additional demonstration may be required.

7.9 Continual Improvement

The FFS QP shall include a procedure for continual improvement. The procedure shall address risks and opportunities related to the overall process, effectiveness, capabilities and performance of the FFS QP.

Note: As part of an Owner's PEIM system, an element of continual improvement has been established with a documented procedure for corrective and preventative action. This procedure may apply to the FFS QP provided that it is reviewed, accepted and identified as part of the FFS QP.

7.10 Application and Implementation

7.10.1 FFS QP Review and Demonstration Process

An Owner-User who intends to develop, implement and maintain an FFS QP, shall inform the ABSA SCO (Design Survey) in writing (Notice of Intent) addressed to ABSA's official mailing address, attention to the Design Survey Dept. This will initiate the process of review and demonstration of effectiveness of the FFS QP.

A written FFS QP must be provided which describes the system the Owner uses to meet the requirements set forth in AB-506, AB-512,

AB-513 and AB-535. The written description of the FFS QP shall clearly demonstrate where the AB-506, AB-512, AB-513 and AB-535 required elements are covered, addressed, and demonstrate objective evidence of effectiveness.

7.10.2 FFS QP Acceptance and Implementation

Following the successful review and demonstration of the FFS QP, the Owner-User shall contact the ABSA SCO (Quality Systems Certification Program - QSCP). This will initiate the process of acceptance, implementation and integration of the FFS QP within the Owner-User PEIMS.

Contact info:
Head Office
9410 20th Avenue NW,
Edmonton, Alberta T6N 0A4
Tel (780) 437-9100 / Fax (780) 437-7787

Optionally, an official email may be sent to ABSA designated to
design@absa.ca related to 7.10.1 above and
cap@absa.ca related to 7.10.2 above

The AB-512(a) Owner-User PEIMS Scope and Responsibilities form provides specific information regarding the scope of the PEIMS, responsible personnel and includes a listing of the facilities that are owned or operated by the organization which will be covered under the scope of the certificate of authorization permit. The FFS QP shall be included under the section describing “repairs that are inspected and certified by the owner-user (per AB-513)”.

7.11 Alteration Workflow Guideline

Figure: 1
Decision flow diagram, before commencing to FFS

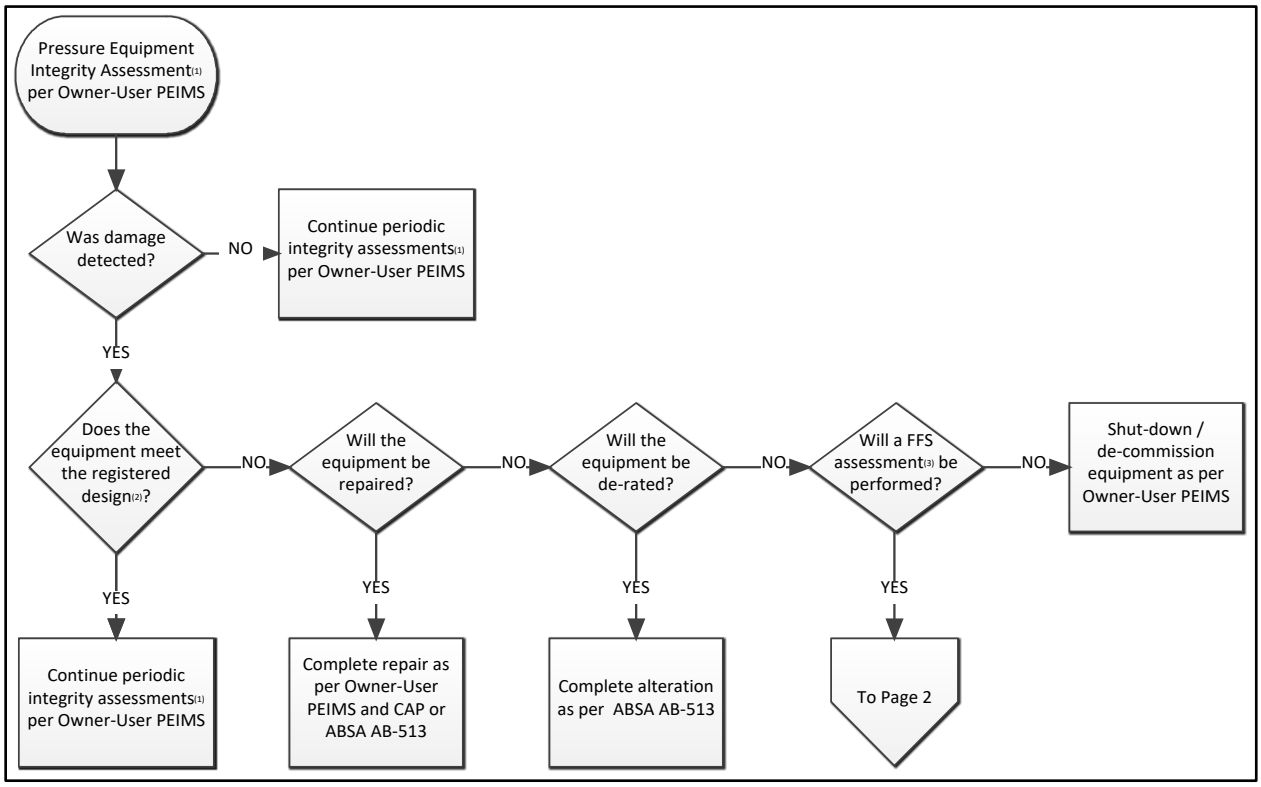
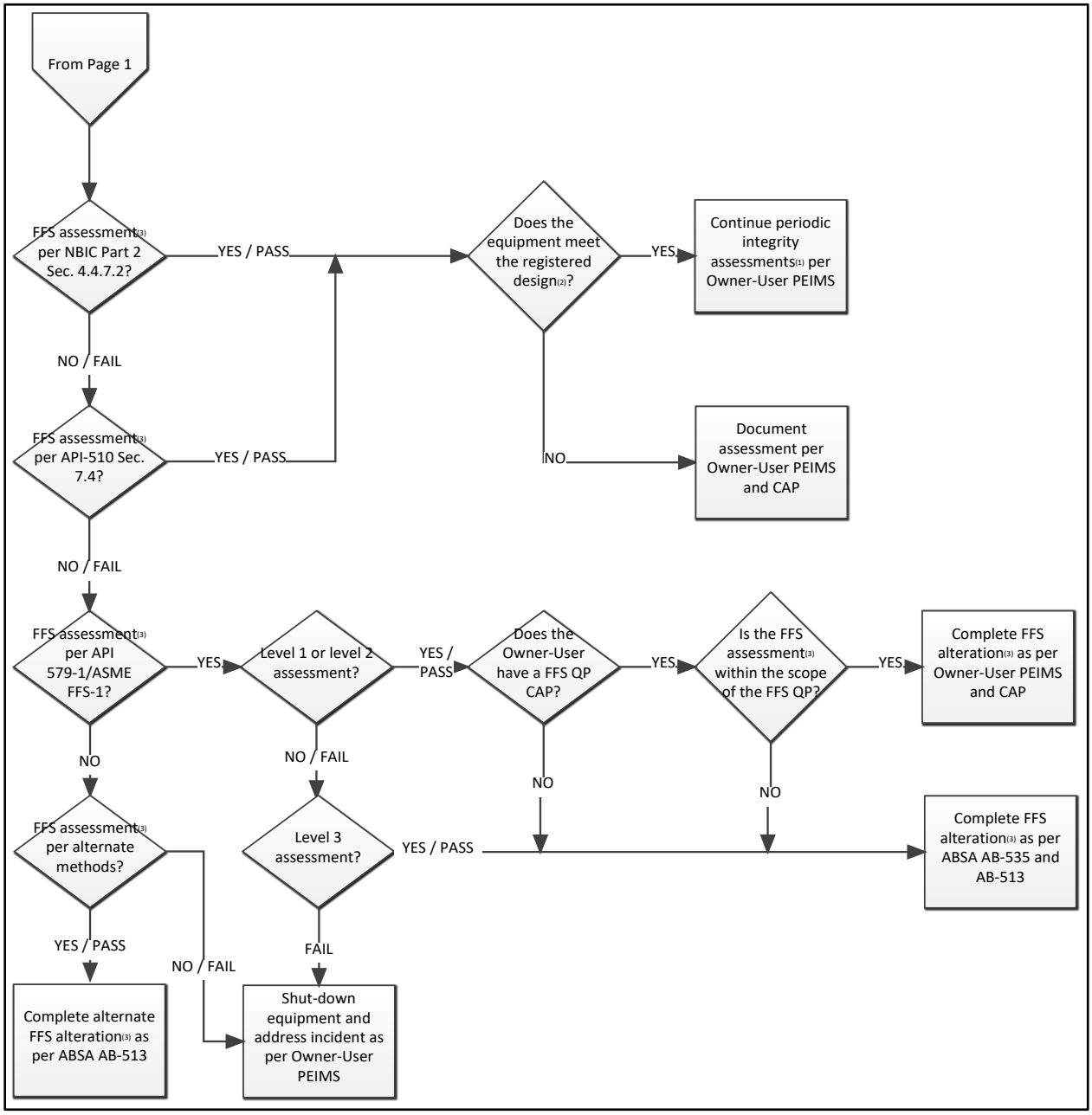


Figure: 2
FFS process flow diagram



(1) Integrity Assessment – As defined in Section 3.0 of AB-512.
(2) Registered Design – As defined in Section 2.0 of AB-535.
(3) Refer to the definitions of Fitness-For-Service and FFS Alteration for details on FFS Assessment vs. FFS Alteration, as defined in Section 2.0 of AB-535.

7.0 REVISION LOG

Edition #	Revision #	Date	Description
1st Edition issued 2018-06-27			
2	0	2019-12-10	Added Annex B and minor editorial revisions throughout.
2	1	2020-12-22	Minor editorial revisions throughout
2	2	2021-12-01	Minor editorial revisions throughout
3	0	2026-10-02	New Edition Addition of new sections and editorial revisions throughout