KINGS ENERGY SERVICES LTD.
QUALITY MANAGEMENT SYSTEM MANUAL

For the following site addresses

Head Office, Red Deer, AB
277 Burnt Park Drive
Red Deer County, Ab.
T4S-0K7
ASVS-50

Provost, AB
5020-50th Avenue
Provost Ab.
T0B-3S0
ASVS-50

Grande Prairie, AB
713004-RR64
Grande Prairie County
T8W-5E5
ASVS-50

On Site Unit, AB
277 Burnt Park Drive
Red Deer County Ab.
T4S-0K7
ASVS-50

Drayton Valley, AB
3205-63rd Street
Drayton Valley
T7A-1R8
ASVS-50

Sarnia, ON
1018 Prescott Dr. Unit #2
Sarnia, Ont
N7T-7H3
QA05696

Nisku, AB
#5, 1504 8th Street
Nisku, AB
T9E-7S6
ASVS-50

MANUAL # XX

Issued To XXXXX

Index

1 Scope

Kings Energy Service's Quality Management System scope is described as:
Construction, repair, and alteration of pressure piping, and fittings; service and repair of oil and gas related valves and meters, assembly and testing of oil and gas metering systems; the testing, setting and servicing of relief valves, safety valves and safety relief valves; the testing, setting and serving of relief valves, safety relief valves and safety relief valves on site, using Kings On-Site Unit (KOU) based at our Red Deer Branch. The repair and service of Fluid Control Electro-Hydraulic Actuation. The recertification of oil and gas overhead equipment The Machining of Safety Relief Valve Parts, Service, supply and electrical installation; manufacture of API 6D ball valves, and the provision of pressure equipment verification and calibration services.

The original release of this QMS Manual has been approved by:

Scott Fraser, President _____ **Date:** 29-Jul-2024

The contents of this Quality Manual and the Quality Procedures, Quality Forms and Quality Work Instructions listed in the Table of Contents at Annex B have been reviewed and approved by;

Kurt Mayer QHSE Manager _____ **Date:** 29-Jul-2024

The contents of this Quality Manual and the Quality Procedures, Quality Forms and Quality Work Instructions listed in the Table of Contents at Annex C have been reviewed and accepted by; For ASVS-50

Alberta Boilers Safety Association
Sandy Sanderson
NB 12063 AB-452
D00008654
Safety Codes Officer

Sandy Sanderson ABSA
Safety Codes **Officer** _____ **Date:** Nov. 21, 2024

The contents of this Quality Manual and the Quality Procedures, Quality Forms and Quality Work Instructions listed in the Table of Contents at Annex D have been reviewed and accepted by;

Douglas Brown ABSA AQP
Authorized Inspector _____ **Date:** _____

The contents of this Quality Manual and the Quality Procedures, Quality Forms and Quality Work Instructions listed in the Table of Contents at Annex F have been reviewed and accepted by;

TSSA
Representative

_____ **Date:** August 9, 2024

The contents of this Quality Manual and the Quality Procedures, Quality Forms and Quality Work Instructions listed in the Table of Contents at Annex C have been reviewed and accepted by;

TSASK Authorized Safety Officer Yimin Song, P. Eng. **Date:** Jan. 08, 2020

1.1 Scope of Work ABSA ASVS

Kings Energy Services is engaged in the servicing, repairing, setting, machining and testing of non-code and ASME code relief valves, safety valves and safety relief valves.
For procedures to test, repair and service Pressure Relief Devices (PRD, s) that meet the ABSA jurisdictional requirements refer to QP9.3 ABSA ASVS Pressure Relief Devices Servicing and Testing.

1.2 Scope of Work ABSA AQP

ABSA AQP scope of work is as described in QP9.9 ABSA Pressure Vessel, Piping and Fitting Scope of Work. All Performance Testing Equipment shall be qualified to ensure that testing procedures will provide accurate results when used within ranges in the scope of work identified in this manaual.

1.3 Scope of Work TSSA

Kings Energy Services is engaged in repairing, setting, machining and testing of ASME section I, and XIII code relief valves, safety valves and safety relief valves using original equipment manufactured parts on air/gas, liquid and steam at 1018 Prescott Drive Unit #2 Sania Ontario and field. Section I valves maybe be repaired at this location, but final set must be verified at/on a National Board or TSSA accredited facility/bench. Non-code valves may also be repaired and set at this facility.

For procedures to test, repair and service Pressure Relief Devices (PRD, s) that meet the Technical Standards and Safety Authority jurisdictional requirements refer to Annex F Technical Standards and Safety Authority Addendum/ Technical Standards and Safety Authority Quality Manual.

1.4 Scope of Work Technical Safety Authority of Saskatchewan TSASK

Kings Energy Services is engaged in the servicing, repairing, setting, machining and testing of non-code and ASME code relief valves, safety valves and safety relief valves. All PRD repairs are in accordance to Technical Safety Authority of Saskatchewan safety Act and codes.
For procedures to test, repair and service Pressure Relief Devices (PRD, s) that meet the TSASK jurisdictional requirements refer to QP9.3 Pressure Relief Devices Servicing and Testing

1.5 Scope of Work – Red Deer

Red Deer (Size and Pressure Range)
Kings Energy
Head Office.
277, Burnt Park Drive
Red Deer County, AB

The scope of work at this location includes Steam Testing, machining and field service of welded in-line valves.
The Division Manager Valves is responsible for the Quality Control and reports to the Director Operational Services

- N.B. /A.S.M.E. Air/vapor valves up to 8"NPS with a maximum setting of 1,296 psi will be tested on bench RD #1 using air. Vessel A # A2746421
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 1,296 psi will be tested on bench RD #1 using air. Vessel A # A2746421
- N.B. /A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 2,140 psi will be tested on bench RD #2 using air.
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 2,140 psi will be tested on bench RD #2 using air.
- N.B. / A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 4,500 psi will be tested on bench RD #4 using air/nitrogen.
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 4,500 psi will be tested on bench RD #4 using air/nitrogen.
- N.B. / A.S.M.E. Liquid valves up to 8" NPS with a maximum setting of 1,800 psi will be tested on bench RD #5 using liquid/air. Vessel A # A528190
- NON-CODE Liquid valves up to 8" NPS with a maximum setting of 1,800 psi will be tested on bench RD #5 using liquid/air. Vessel A # A528190
- N.B. /A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 14,000 psi will be tested on bench RD #6 using liquid/air.
- N.B. /A.S.M.E. & NON-CODE Liquid valves up to 8" NPS with a maximum setting of 14,000 psi will be tested on bench #6 using liquid/air.

N.B. /A.S.M.E. CODE Steam valves up to 10" NPS with a maximum setting of 15,000 psi will be tested on bench # RD-ST-1 using an Assist Lift Device (ALD)

- For any valves requiring set pressures exceeding the limitation of the Bench scope, the ALD can be used in conjunction to achieve the required acceptance criteria
- For any valves requiring Leak Testing for pressures exceeding the scope of the Test Bench / Boiler; The ALD will be used in conjunction to achieve the required acceptance criteria.

Consult the QF9.36 Ventil Pre-Vent Test Force Chart for ALD limits and load cell selection.

Red Deer Seals

1.6 Scope of Work – Red Deer On Site Unit

Red Deer on Site Unit (Size and Pressure Range)
Kings Energy
Head Office.
277, Burnt Park Drive
Red Deer County, AB

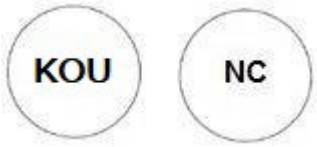
The scope of work at this location includes machining.

The Division Manager Valves is responsible for the Quality Control and reports to the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 14" NPS with a maximum setting of 2,700 psi will be tested on bench # OSU #1 using air.
- NON-CODE Air/vapor valves up to 14" NPS with a maximum setting of 2,700 psi will be tested on bench # OSU #1 using air.
- N.B. /A.S.M.E. Liquid valves up to 14" NPS with a maximum setting of 2,700 psi will be tested on bench # OSU #1 using water.
- NON-CODE Liquid valves up to 14" NPS with a maximum setting of 2,700 psi will be tested on bench # OSU #1 using water.

Steam service is available at Kings Red Deer and Grande Prairie locations

On Site Unit Seals



1.7 Scope of Work – Drayton Valley

Drayton Valley (Size and Pressure Range)
Kings Energy
3205-63 Street
Drayton Valley, AB
T7A-1R8

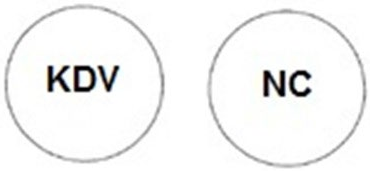
The scope of work at this location includes machining.

The Division Manager Valves is responsible for the Quality Control and reports to the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 3,000 psi will be tested on bench # KDV#1 using air. Vessel A # KDVTR#3
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 3,000 psi will be tested on bench # KDV#1 using air. Vessel AA# KDVTR#3
- N.B. /A.S.M.E. Liquid valves up to 8" NPS with a maximum setting of 3,000 psi will be tested on bench # KDV#2 using water. Vessel AA# KDVJT#2
- N.B. /A.S.M.E. Liquid pilot valves up to 8" NPS with a maximum setting of 3,000 psi will be tested on bench # KDV#2 using water. Vessel AA# KDVJT#2
- NON-CODE Liquid valves up to 8" NPS with a maximum setting of 3,000 psi will be tested on bench # KDV#2 using water. Vessel # KDVJT#2
- N.B/A.S.M.E. & NON CODE Air/Liquid valves up to 8" NPS with a maximum setting of 5,400 psi will be tested on bench # KDV#3

Steam service is available at Kings Red Deer and Grande Prairie locations

Drayton Valley Seals



1.8 Scope of Work – Grande Prairie

Grande Prairie (Size and Pressure Range)
Kings Energy Services
713004-RR64,
Grande Prairie, AB
T8V 0N3

The scope of work at this location includes steam testing, machining and field service of welded in- line valves.

The Division Manager valves is responsible for the Quality Control and reports to the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 10" NPS with a maximum setting of 2,700 psi will be tested on bench GP #1 using air. Vessel A# A135514
- NON-CODE Air/vapor valves up to 10" NPS with a maximum setting of 2,700 psi will be tested on bench GP #1 using air. Vessel A# A135514
- N.B. /A.S.M.E. Air/vapor pilot valves up to 10" NPS with a maximum setting of 2,700 psi will be tested on bench GP#1 using air. Vessel A# A135514
- N.B. /A.S.M.E. Liquid valves up to 8" NPS with a maximum setting of 2,700 psi will be tested on bench GP #2 using water. Vessel A# A450760
- NON-CODE Liquid valves up to 8" NPS with a maximum setting of 2,700 psi will be tested on bench GP #2 using water. Vessel A# A450760
- N.B. /A.S.M.E. & NON-CODE Air/ Liquid valves up to 10" NPS with a maximum setting of 6,000 psi will be tested on bench GP #3 using Air / Liquid. Vessel
- N.B. /A.S.M.E. & NON-CODE Air/Gas valves up to 8" NPS with a maximum setting of 2,520 psi will be tested on bench GP#4 using Air Vessel A # A436907
- N.B. /A.S.M.E. CODE Steam valves up to 10" NPS with a maximum setting of 15,000 psi will be tested on bench #GP-ST-1 using an Assist Lift Device (ALD).
- For any valves requiring set pressures exceeding the limitation of the Bench scope, the ALD can be used in conjunction to achieve the required acceptance criteria
- For any valves requiring Leak Testing for pressures exceeding the scope of the Test Bench / Boiler; The ALD will be used in conjunction to achieve the required acceptance criteria.

Consult the QF9.36 Ventil Pre-Vent Test Force Chart for ALD limits and load cell selection.

Grande Prairie Seals

1.9 Scope of Work – Provost

Provost (Size and Pressure Range)
Kings Energy
5020-50th Ave
Provost, AB. T0B-3S0

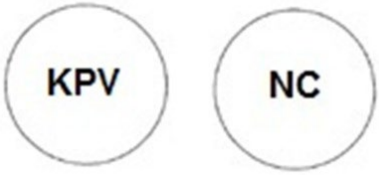
The scope of work at this location includes machining.

The Division Manager Valves is responsible for the Quality Control and reports to the Director Operational Services.

- N.B. A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 2,619 psi will be tested on bench PVA using Air/Nitrogen. Vessel A # A432864
- N.B. A.S.M.E. Air/Vapor Pilot valves up to 8" NPS with a maximum setting of 2,619 psi will be tested on bench PVA using Air/Nitrogen. Vessel A # A432864
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 2,619 psi will be tested on bench PVA using Air/Nitrogen. Vessel A # A432864
- N.B. A.S.M.E. Liquid up to 8" NPS with a maximum setting of 2,430 psi will be tested on bench PVL using water. Vessel A # A474854
- NON-CODE Liquid up to 8" NPS with a maximum setting of 2,430 psi will be tested on bench PVL using water. Vessel A # A474854

Steam service is available at Kings Red Deer and Grande Prairie locations

Provost Seals



1.10 Scope of Work- Sarnia

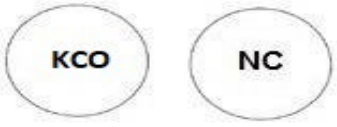
Sarnia (Size and Pressure range)
1018 Prescott Dr. Unit# 2
Sarnia, ONT
N7T-7H3

The scope of work at this location includes air, liquid, and Steam Testing, machining and field service of in-line valves.

The Division Manager is responsible for Quality Control and reports the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO 1 using air/nitrogen.
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO 1 using air/nitrogen.
- N.B. /A.S.M.E. Air/vapor pilots' valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO1 using air/nitrogen.
- N.B. /A.S.M.E. Liquid valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO 2 using water.
- N.B. /A.S.M.E. & NON-CODE Liquid valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench #2 using water.
- N.B. /A.S.M.E. CODE Steam valves up to 8" NPS with a maximum setting of 400 psi will be tested on bench # CO2 using steam.
- For any valves requiring set pressures exceeding the limitation of the Bench scope, the ALD can be used in conjunction to achieve the required acceptance criteria
- For any valves requiring Leak Testing for pressures exceeding the scope of the Test Bench / Boiler; The ALD will be used in conjunction to achieve the required acceptance criteria.
  Consult the QF9.36 Ventil Pre-Vent Test Force Chart for ALD limits and load cell selection.

SARNIA Seals



1.11 Scope of Work – Sarnia On Site Unit

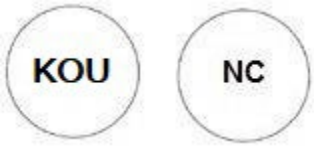
SARNIA (Size and Pressure range)
1018 Prescott Dr. Unit #2
Sarnia, ONT
N7T-7H3

The scope of work at this location includes machining.

The Division Manager is responsible for the Quality Control and reports to the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 14" NPS with a maximum setting of 3,000 psi will be tested on bench # OSU #1 using air.
- NON-CODE Air/vapor valves up to 14" NPS with a maximum setting of 3,000 psi will be tested on bench # OSU #1 using air.
- N.B. /A.S.M.E. Liquid valves up to 14" NPS with a maximum setting of 3,000 psi will be tested on bench # OSU #1 using water.
- NON-CODE Liquid valves up to 14" NPS with a maximum setting of 3,000 psi will be tested on bench # OSU #1 using water.

On Site Unit Seals



1.12 Scope of Work – Nisku

Nisku (Size and Pressure Range)
#5, 1504-8 Street
Nisku, AB

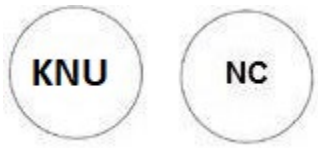
The scope of work at this location includes machining.

The Division Manager Valves is responsible for the Quality Control and reports to the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 14" NPS with a maximum setting of 2,430 psi will be tested on bench # KNU #1 using air.
- NON-CODE Air/vapor valves up to 14" NPS with a maximum setting of 2,430 psi will be tested on bench # KNU #1 using air.
- N.B. /A.S.M.E. Liquid valves up to 14" NPS with a maximum setting of 2,430 psi will be tested on bench # KNU #1 using water.
- NON-CODE Liquid valves up to 14" NPS with a maximum setting of 2,430 psi will be tested on bench # KNU #1 using water.

Steam service is available at Kings Red Deer and Grande Prairie locations

Nisku Seals



2 Normative References

The following document is referred to in the text in such a way that some or all of the content constitutes the requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

ISO 9000:2015, Quality management systems—Fundamentals and vocabulary

3 Terms, Definitions, and Acronyms

See Annex A

4 Quality Management System Requirements

4.1 Quality Management System

4.1.1 General

The organization shall plan, establish, document, implement, and maintain at all times a quality management system in accordance with the requirements of this specification for product provided within the scope defined by the organization (see 4.1.4.1). The organization shall measure and improve the effectiveness of the quality management system.

4.1.2 Quality Policy

Kings Energy Services shall define, document, review, and approve its commitment to quality through a policy established by top management. This quality policy will: (a) be appropriate to Kings Energy Services and support its strategic direction, (b) serve as the foundation for developing quality objectives (see 4.1.3), (c) be communicated, understood, implemented, and maintained within the company, (d) be accessible to relevant interested parties as specified by Kings Energy Services, and (e) include a commitment to conform to requirements and continually enhance the effectiveness of the quality management system.

Evidence of Kings Energy Service's Quality Policy approval is the inclusion of the policy and approval of this Manual by Top Management, and is as follows:

Kings Energy is a trusted global supplier of high quality safety valves, instrumentation, Electrical Services, metering, Fluid Control Electro-hydraulic Actuation, Equipment recertification and related equipment. Ensuring we deliver high standards of service from our people, we meet or exceed our client's expectations for quality, on-time deliveries, and value. Kings management is committed to complying with the requirements and continually improving the effectiveness of the quality management system.

4.1.3 Quality Objectives (QP10.1, QF10.1)

Management personnel, with approval from top management, ensures that quality objectives, including those needed to meet product and customer requirements, are established at relevant functions and levels within Kings Energy Services. The quality objectives are measurable and consistent with the quality policy. Quality Objectives are defined in the Management Review record and are evaluated in Data Analysis activities. Kings will determine the activities, resources, responsibilities, completion dates and timeframes, and evaluation methods for achieving the quality objectives.

4.1.4 Planning the Quality Management System (QP17.1, QP15.1, QP10.1, QP12.1)

4.1.4.1 General

Planning of the quality management system shall be performed. Kings Energy Services will:

a) define the scope of the quality management system, that identifies product(s) covered (see 3.1.16) and includes any limitations and exclusions (see 4.1.4.2);
b) identify external and internal issues relevant to Kings Energy Services long-term or overall objectives and goals;
c) determine relevant interested parties and their requirements for the quality management system;
d) determine the sequence and interaction between the processes of the quality management system;
e) determine and manage the criteria and methods needed for the effective operation and control of quality management system processes;
f) identify quality objectives, including actions, resources, responsibilities, timeframe, and how results are monitored and evaluated;
g) address identified risks (see 5.3);
h) address identified opportunities for improvement (see 6.4); and identify key personnel.

4.1.4.2 Exclusions

If Kings Energy Services performs activities covered by this specification, including those that are outsourced (see 5.5.1.7), no claims to exclusion of those activities shall be permitted. Excluded activities will not impact Kings Energy Services' ability or responsibility to deliver products that meet customer and legal requirements. Where exclusions are claimed, the justification must be documented [see 4.4.1, Item a)].

Allowable exclusions shall be limited to the following sections of this specification:

— 5.4, Design
— 5.6.4, Validation of Processes
— 5.6.7, Externally Owned Property
— 5.6.8, Preservation of Product
— 5.8, Testing, Measuring, Monitoring, and Detection Equipment (TMMDE)

4.1.5 Communication

4.1.5.1 Internal (QP4.1, QP9.1, QP10.1)

Kings Energy Services shall establish internal communication processes.
The processes shall include communicating at relevant levels and functions within Kings Energy Services:

a) the importance of satisfying customer, legal, and other applicable requirements; and
b) the results of analysis of data (see 6.3)

4.1.5.2 External (QP4.1)

Kings Energy Services shall establish and implement a process for communicating with external organizations, including customers.
The process shall address:

a) execution of inquiries, contracts, or order handling and amendments (see 5.1);
b) determining and understanding requirements throughout contract execution and product realization (see5.1.2);
c) provision of product information, including nonconformities (see 5.9.3 and 5.9.4);
d) feedback and customer complaints (see 6.2.1);
e) communication of quality plans including subsequent changes (see 5.6.2); and communicating changes and associated risks (see 5.10.3).

4.2 Management Responsibility

4.2.1 General

Top management shall demonstrate leadership and commitment to the establishment, implementation, maintenance, and improvement of the quality management system by:

a) approving establishment of quality objectives (see 4.1.3) at relevant functions and levels within the organization;
b) providing resources needed for the quality management system;

NOTE Resources can include human resources and specialized skills, organizational infrastructure, financial resources, and technology.

c) engaging and supporting personnel in the implementation and maintenance of the quality management system; and
d) assigning responsibilities and authorities for ensuring the processes achieve intended outputs.

4.2.2 Responsibility and Authority (QP17.1, Job Descriptions, Organizational Chart)

In Kings Energy Services, the responsibilities, authorities, and accountabilities of personnel within the scope of the organization's quality management system shall be defined, documented, and communicated throughout the organization.

4.2.3 Management Representative

Top management at Kings Energy Services shall appoint and maintain a member of the organization's management personnel who, regardless of other responsibilities, shall have the authority and responsibility to:

a) ensuring that the quality management system conforms to the requirements of this specification;
b) ensuring that processes needed for the quality management system are established, implemented, and maintained;
c) reporting to top management on the performance of the quality management system and any need for improvement;
d) ensuring initiation of action(s) to address nonconformities (see 6.4.2); and
e) ensuring the promotion of awareness of customer requirements throughout the organization

4.3 Organization Capability

4.3.1 Resources and Knowledge

4.3.1.1 Resources

Kings Energy Services shall determine and allocate the resources needed to implement, maintain, and improve the effectiveness of the quality management system.

4.3.1.2 Knowledge

Kings Energy Services shall determine the knowledge needed to provide continued operation of its processes (see 5.6) and achieve ongoing conformity of products (see 5.1). This knowledge shall be maintained and made available as determined by the organization.

NOTE Knowledge can be acquired through experience, study, training, lessons learned, best practices, or other sources.

4.3.2 Human Resources (QP17.1, QF17.4)

4.3.2.1 Personnel Competence (QP17.1)

Personnel at Kings Energy Services whose responsibilities fall within the scope of the quality management system shall be competent. Kings Energy Services shall maintain a documented procedure addressing personnel competence. The procedure shall address:

a) how required competencies are identified and documented;
b) how required education, training, experience, or other actions to achieve competence are identified;
c) evaluation of effectiveness of actions taken to acquire competencies;
d) criteria and methods for assessing, maintaining and, re-assessing competencies; and
e) personnel responsible for assessing competency.

Records of personnel competence shall be maintained (see 4.5).

4.3.2.2 Training (QF17.4)

Kings Energy Services shall develop and maintain a procedure for training that shall address:
a) identification of the content and frequency of training required;
b) provision of quality management system training;c) provision of job training including personnel awareness of the relevance and importance of their activities and how they contribute to the achievement of the organization's quality objectives;
c) provision of job training including personnel awareness of the relevance and importance of their activities and how they contribute to the achievement of the organization's quality objectives;
d) provision of customer-specified training and/or customer-provided training, when required;
e) evaluation of effectiveness of training; and
f) identification of required training records.
Records of personnel training shall be maintained (see 4.5)

4.3.3 Work Environment (QP10.1, QF10.1)

Kings Energy Services shall determine, provide, manage, and maintain the work environment needed to achieve conformity of the product. Work environment shall include:
a) buildings, workspace, and associated utilities;
b) process equipment (both hardware and software) (see 5.6.10);
c) supporting services (e.g. transport, communication, information systems); and
d) conditions under which work is performed such as physical, environmental, or other factors.

4.4 Documentation Requirements

4.4.1 General (QP1.1)

The quality management system documentation shall include:
a) the scope of the quality management system that identifies product(s) covered (see 3.1.16) and includes justification for any exclusions (see 4.1.4.2);
b) statements of quality policy and quality objectives;
c) identification of legal and other applicable requirements to which the organization claims compliance that are needed to achieve product conformity;
d) identification of how the quality management system addresses each requirement of this specification;
e) identification of processes that require validation (see 5.6.4); and
f) procedures, documents, and records necessary for the planning, operation, and control of its processes and conformance with specified requirements.

NOTE Some of the above documentation has been traditionally included as part of a quality manual but can be many different formats and can be either a single document or multiple documents.

4.4.2 Procedures (QP1.1)

All procedures (see 3.1.15) required by this specification shall describe Kings Energy Services' method for performing an activity and shall be documented, implemented, and maintained for continued suitability.
NOTE A single procedure can address the requirements for one or more documented procedures. Any requirement for a documented procedure can be satisfied by more than one procedure.

4.4.3 Control of Internal Documents (QP1.1)

Kings Energy Services shall maintain a documented procedure for the identification, distribution, and control of internal documents required by the quality management system and this specification, including revisions, translations, and updates
The procedure shall address:
a) responsibilities for approval and re-approval;
b) review and approval for adequacy prior to issue and use;
c) reviews for continued suitability and revision(s) as necessary;
d) identification of changes and current revision status;
e) legibility and identification of documents; and
f) availability where the activity is being performed.

Obsolete documents shall be removed from all points of issue or use, or otherwise identified to prevent unintended use if they are retained for any purpose.

Procedures, work instructions, and forms required by the quality management system shall be controlled.

4.4.4 Control and Use of External Documents (QP1.1)

Kings Energy Services shall maintain a documented procedure for the control of documents of external origin required for product realization and used by the organization, including API or other external specifications. The procedure shall address:
a) identification and documentation of required documents;
b) access and distribution of required documents, including relevant versions;
c) integration of requirements into product realization and any other affected processes;
d) process for identifying when changes to required documents have occurred, including addenda, errata, and updates;
e) assessment of impact of changes; and
f) integration of applicable changes.

NOTE Normative references that are identified within API product or other external specifications and are required during product realization can also be considered an external document.

4.5 Control of Records (QP2.1)

Records, including those originating from outsourced activities (see 5.5.1.7), shall be established and controlled to provide evidence of conformity to requirements and Kings Energy Services quality management system.

Kings Energy Services shall maintain a documented procedure to identify the controls and
a) identification;
b) collection;
c) legibility;
d) correction;
e) storage;
f) protection from unintended alteration, damage, or loss;
g) retrieval;
h) retention time; and
I) disposition

Records shall be retained for a minimum of ten years or as required by customer, legal, and other applicable requirements, whichever is longer.

5 Product Realization

5.1 Contract Review

5.1.1 General

Kings Energy Services shall maintain a documented procedure for the review of requirements related to the provision of product. The procedure shall address:
a) determination of requirements;
b) review of requirements; and
c) changes to requirements.

5.1.2 Determination of Requirements (QP4.1)

Kings Energy Services shall determine:
a) requirements specified by the customer;
b) legal and other applicable requirements; and
c) requirements not stated by the customer but considered necessary by Kings Energy Services for the provision of product.

Where the customer provides no documented statement of the requirements, the customer requirements shall be confirmed by Kings Energy Services and records maintained (see 4.5).

5.1.3 Review of Requirements (QP4.1)

Kings Energy Services shall review the requirements related to provision of product. This review shall be conducted prior to the organization's commitment to deliver product to the customer and shall confirm that:

a) requirements are identified and documented;
b) requirements differing from those previously identified are resolved; and
c) the organization has the capability to meet the documented requirements.

Where contract requirements are changed, the organization shall amend the relevant documents and make relevant personnel aware of the changed requirements.

Records of the results of the review, including resulting actions, shall be maintained (see 4.5).

5.2 Planning

Kings Energy Services shall identify and plan the processes and documents needed for product realization. In planning, the organization shall address the following:

a) required resources and work environment management (see 4.3);
b) product and customer-specified requirements (see 5.1);
c) legal and other applicable requirements;
d) design requirements (see 5.4);
e) contingency planning (see 5.3.3);
f) required verification, validation, monitoring, measurement, inspection, and test activities specific to the product and the criteria for acceptance;
g) management of change (MOC) (see 5.10); and
h) records needed to provide evidence that product realization conforms to requirements (see 4.5).

The output of planning shall be documented and updated as changes occur. The plans shall be maintained in a structure suitable for the organization's method of operations.

5.3 Risk Management (QP17.1)

5.3.1.1 General

Kings Energy Services shall maintain a documented procedure to identify and control risk associated with product delivery and product quality.
The procedure shall address:

a) risk identification and assessment techniques;
b) risk assessment tools and their application;
c) criteria to determine risk severity including potential consequences of product failure;
d) risk mitigation actions;
e) assessment of remaining risk; and
f) contingency planning, including when a contingency plan is required based on assessment of remaining risks.

NOTE 1 Risk assessment can include consideration of severity, probability of occurrence, and detectability.
NOTE 2 Risk assessment can be an activity associated with corrective action.

5.3.2 **Risk Assessment (QP17.1)**

5.3.2.1 **Product Delivery**

Risk assessment associated with product delivery shall include:
a) facility/equipment availability including maintenance; and
b) supplier delivery performance and material availability/supply

5.3.2.2 Product Quality

Risk assessment associated with product quality shall include:
a) delivery of nonconforming product (see 5.9); and
b) availability of competent personnel.

5.3.2.3 Changes Impacting Product Quality

If any of the following changes can negatively impact the quality of the product (see 5.10.2), risk assessment associated with product quality (see 5.3.2.2) shall be performed:
a) changes in the organizational structure (see 4.2.2);
b) changes in key personnel (see 4.1.4.1);
c) changes in the supply chain of critical products, components, or activities (see 5.5.1.1);
d) changes to the management system scope or procedures (see 4.4.1); and
e) changes to the organization's capability to perform the process(es) required for product realization.

NOTE Changes can be of internal or external origin

5.3.3 Contingency Planning

When Kings Energy Services determines a contingency plan is required based on assessed risk, the contingency plan shall include, at a minimum:
a) actions required to reduce effects of disruptive incidents;
b) identification and assignment of responsibilities and authorities; and
c) internal and external communication controls (see 4.1.5).

The contingency plan(s) shall be documented, communicated to the relevant personnel, and updated as needed

5.3.4 **Records**
Records of risk assessment and management including actions taken shall be maintained (see 4.5).

5.4 Design (QP3.1)

5.4.1 General

When Kings Energy Services is responsible for the design of products, the requirements of 5.4 shall apply.

NOTE In previous editions the term “design” was referred to as “design and development”.

5.4.2 Design Planning

Kings Energy Services shall maintain a documented procedure to plan and control the design process. The procedure shall address:

a) the plan(s), including plan updates, used for design;
b) the design stages;
c) the resources, responsibilities, authorities, and their interfaces;
d) the review, verification, and validation activities necessary to complete each design stage;
e) the requirements for a final review of the design (see 5.4.6); and
f) the review and approval requirements for design changes (see 5.4.8).

When design activities are outsourced or performed at different locations within Kings Energy Services, the procedure shall identify the controls to ensure that the requirements of 5.4 are satisfied. When design activities are outsourced, Kings Energy Services shall remain responsible for the design and demonstrate that the supplier conforms to the requirements of 5.5.1.7.

NOTE Design review, verification, and validation each have distinct purposes but can be conducted and recorded separately or in any combination, as suitable for the product and the organization.

5.4.3 Design Inputs

Inputs shall be identified and reviewed for adequacy, completeness, lack of ambiguity, and lack of conflict. Any identified issues shall be addressed.
Inputs shall include functional and technical requirements, and the following, as applicable:

a) customer-specified requirements (see 5.1);
b) requirements provided from external sources, including API product specifications;
c) environmental and operational conditions;
d) methodology, assumptions, and formulae documentation;
e) historical performance and other information derived from previous similar designs;
f) legal requirements; and
g) consequences of potential product failure, when required by legal requirements, industry standards, customers, or deemed necessary by the organization.

Records of design inputs shall be maintained (see 4.5).

5.4.4 Design Outputs

Outputs shall be documented to allow verification against the design input requirements.

Outputs shall:
a) meet the input requirements for design
b) provide information for purchasing, production, inspection, testing, and servicing, as applicable;
c) identify or reference design acceptance criteria (DAC);
d) include identification of, or reference to, products, components, and/or activities deemed critical to the design;
e) include results of applicable calculations; and
f) specify the characteristics of the product that are essential for its intended purpose and its safe and proper function.

Records of design outputs shall be maintained (see 4.5).

NOTE Identification of criticality of products, components, and/or activities can be maintained outside of the design process.

5.4.5 Design Review

At suitable stages, review(s) shall be performed:
a) to evaluate the suitability, adequacy, and effectiveness of the results of design stages to meet specified requirements; and
b) to identify any problems and propose necessary actions.

Participants in such review(s) shall include representatives of functions concerned with the design stage(s) being reviewed.

Records of the results of the review(s) and any necessary actions shall be maintained (see 4.5).

5.4.6 Design Verification and Final Review

To ensure that the design outputs have satisfied the design input requirements, design verification and a final review shall be conducted and documented as identified within the organization's procedure (see 5.4.2).

Records of design verification, any necessary actions, and the final review shall be maintained (see 4.5).

5.4.7 Design Validation and Approval

Design validation shall be performed in accordance with the organization's procedure (see 5.4.2) to ensure that the resulting product is capable of satisfying the specified requirements. Validation shall be completed prior to the delivery of the product, when possible.

The completed design shall be approved after validation. Competent (see 4.3.2.1) individual(s) other than the person or persons who developed the design shall approve the final design.

Records of the design validation, approval, and any necessary actions shall be maintained (see 4.5).

5.4.4 Design Changes

Design changes shall be identified. The changes shall be reviewed, verified, and validated, as appropriate, and approved before implementation.

The review of design changes shall include evaluation of the effect of the changes on the product and their component parts in affected stages of product realization, as well as product already delivered. The review of design changes shall include an evaluation to determine if customer notification is required when design changes negatively affect the specified performance capability of the product.

Design changes, including changes to design documents, shall be in accordance with the organization's procedure (see 5.4.2).

Records of design changes, reviews of those changes, and any necessary actions shall be maintained (see 4.5).

5.5 Purchasing

5.5.1 Purchasing Control

5.5.1.1 Procedure (QP5.1, QP6.1)

The organization shall maintain a documented procedure for the purchase of products, components, and/or activities required for product realization.

The procedure shall address:

a) determination of critical products, components, and/or activities;

b) initial evaluation and selection of suppliers;

c) use of identified risk to determine initial assessment method of supplier's capability for critical purchases [see 5.5.1.2, Item c)];

d) type and extent of control applied to the supply chain for critical products, components, or activities;

NOTE Section 5.5.1.7 contains additional requirements for outsourced activities.

e) criteria, scope, frequency, and methods for re-evaluation of suppliers;

f) identification of approved suppliers and scope of approval; and

g) identification of customer specified suppliers and suppliers limited by proprietary, and/or legal requirements when 5.5.1.3 applies.

5.5.1.2 Initial Supplier Evaluation—Critical Purchases (QP5.1)

For the purchase of critical products, components or activities, the initial evaluation of suppliers (not previously approved) shall address the scope of supply, be site-specific for each supplier and include the following:

a) verification of the supplier's quality management system implementation and conformity to the quality system requirements specified for suppliers by the organization;

b) verification of the type and extent of control applied by the supplier, internally and to their supply chain, to meet the organization's requirements [see 5.5.1.1, Item d)];

c) assessment of the supplier's capability to meet the organization's specified requirements by one or more of the following based on identified risk [see 5.5.1.1, Item c)]:

    1) performing an on-site assessment to verify that relevant product realization processes are being performed in accordance with process controls, and are effective in achieving conformity to requirements,

2) performing a remote assessment (see 3.1.18) to verify that relevant product realization processes are being performed in accordance with process controls and are effective in achieving conformity to requirements
3) performing inspection, testing, or verification of relevant characteristics of a received product.

For suppliers of critical purchases with high-risk severity [see 5.3.1 Item c)] identified by Kings Energy Services for which an on-site assessment per 5.5.1.2, Item c) 1) is not performed, the assessment of the supplier's capability [see 5.5.1.2, Item c)] shall include performing a remote assessment per 5.5.1.2, Item c) 2) and performing inspection, testing, or verification per 5.5.1.2, Item c) 3).

When performed, remote assessment [see 5.5.1.2, Item c) 2)] shall include verification of objective evidence through real-time audio/visual observation of required activities and documentation using information and communication technology.

Evaluation of a supplier shall also be performed in accordance with the requirements of this section for any additions to a supplier's scope of approval or change from an approved site to a new site of supply.

5.5.1.3 Initial Supplier Evaluation – Critical Purchases – Customer Specified, Proprietary, and/or Legal Limited

For the purchase of critical products, components, or activities where the supplier is specified by the customer or involves proprietary and/or legal requirements that limit application of 5.5.1.2, the initial evaluation shall include the following:

a) verification of the supplier's quality management system implementation and conformity to quality system requirements specified for suppliers by the organization and/or the customer's requirements; and
b) identifying how the supplied product, component or activity conforms to specified requirements.

The scope of approval for customer-specified suppliers shall be limited to the relevant customer contract when assessment per 5.5.1.2, Item c) has not been performed.

5.5.1.4 Initial Supplier Evaluation—Noncritical Purchases (QP5.1)

For the purchase of noncritical products, components, or activities that impact product realization or the final product, the criteria for evaluation of suppliers by the organization shall meet the requirements of 5.5.1.2 or satisfy one or more of the following:

a) verification that the supplier's quality management system conforms to the quality system requirements specified for suppliers by Kings Energy Services;
b) assessment of the supplier to meet the organization's purchasing requirements;
c) assessment of the product or component upon delivery, or activity upon completion.

5.5.1.5 Supplier Reevaluation

For previously approved suppliers of products, components, or activities Kings Energy Services shall determine the supplier reevaluation frequency based on identified risk (see 5.3) and supplier quality performance.

For the re-evaluation of suppliers of critical products, components or activities, the requirements of 5.5.1.2 shall apply.

For the re-evaluation of suppliers of critical products, components or activities for customer specified suppliers and suppliers limited by proprietary, and/or legal requirements, the requirements of 5.5.1.3 shall apply.

For the re-evaluation of suppliers of noncritical products, components, or activities that impact product realization or the final product, the requirements of 5.5.1.4 shall apply.

5.5.1.6 Records

Records of the results of evaluations including objective evidence and any necessary actions arising from the
evaluations shall be maintained (see 4.5).

Records of identification of approved suppliers, customer specified suppliers, and suppliers limited by proprietary, and/or legal requirements shall be maintained (see 4.5).

5.5.1.7 Outsourcing (QP6.1)

When Kings Energy Services chooses to outsource a process or activity of its quality management system, the organization shall verify that the supplier satisfies the applicable requirements of Kings Energy Services quality management system.

When Kings Energy Services chooses to outsource a product realization process or activity, the organization shall maintain responsibility for product conformance to specified requirements, including applicable API or other external specifications.

NOTE See 5.6.4 for requirements when a process requiring validation is outsourced.

Records of outsourced activities shall be maintained (see 4.5) and shall include evidence of conformity (see 5.5.3).

5.5.2 Purchasing Information (QP6.1)

Kings Energy Services shall ensure the adequacy of specified purchasing information prior to communication to the supplier. Purchasing information provided to the supplier shall be documented and describe the product, component, or activity to be purchased, including as applicable:

a) acceptance criteria;
b) requirements for approval of supplier's procedures, processes, and equipment;
c) applicable version of specifications, drawings, process requirements, inspection instructions, traceability requirements, and other relevant technical data;
d) requirements for qualification of supplier's personnel;
e) quality management system requirements;
f) requirements for approval of product release; and
g) the intended verification requirements if the organization or its customer performs verification (see 5.5.3) on the supplier's premises.

NOTE Applicable specifications may include or be derived from the customer, API specifications, design output, and/or industry standards.

5.5.3 Verification of Purchased Products, Components or Activities (QP10.1)

5.5.3.1 General

Kings Energy Services shall maintain a documented procedure defining the verification necessary for determining that purchased products, components or activities conform to specified purchase requirements.

5.5.3.2 Critical Purchases

For critical products, components or activities, Kings Energy Services procedure for verification shall address:

a) review of the organization's required documentation from the supplier;
b) verification that the applicable versions were used when specifications, drawings, process requirements, inspection instructions, traceability requirements, and other relevant technical data are specified per 5.5.2,Item c); and
c) inspection, testing and/or verification requirements including methods, frequency, and responsible party. Kings Energy Services shall determine the methods, frequency, and responsible party based on identified risk (see 5.3) and supplier quality performance.

5.5.3.3 Noncritical Purchases

Noncritical products, components or activities shall be verified in accordance with Kings Energy Services documented procedure.

5.5.3.4 Records

Records of verification activities and evidence of conformity to specified requirements shall be maintained (see 4.5).

5.6 Control of Product Realization

5.6.1 General (QP9.1)

Kings Energy Services shall maintain a documented procedure that describes controls associated with product realization. The procedure shall address the following:

a) determination and implementation of manufacturing acceptance criteria (MAC) (see 3.1.13);
b) identification and documentation of processes critical to product realization;
c) implementation of the quality plan, when applicable (see 5.6.2);
d) conformance to design requirements and related changes, when applicable (see 5.4);
e) the availability and use of product realization equipment and TMMDE (unless TMMDE has been excluded, see 4.1.4.2);
f) the use of applicable work instructions;
g) process control documents (see 5.6.3);
h) maintenance of identification and traceability requirements throughout product realization (see 5.6.5);
i) implementation of monitoring and measurement activities;
j) implementation of product release (see 5.7), including applicable delivery and post-delivery activities; and
k) review and control of product realization changes, required approvals, and records.

5.6.2 Quality Plan (QP9.1)

When required by contract, Kings Energy Services shall develop a quality plan that specifies the processes of the quality management system (including product realization) and the resources to be applied to a product.

The quality plan shall address each of the following as a minimum:

a) description of the product (see 3.1.16) or scope of quality plan;
b) required processes and documentation, including required inspections, tests, and records, for conformance with requirements;
c) identification of outsourced activities and reference to their control;
d) identification of each procedure, specification, or other document referenced or used in each activity; and
e) identification of the required hold, witness, monitor, and document review points.

The quality plan and any revisions to it shall be documented and approved by the organization. The quality plan and any revisions shall be communicated to the customer.

NOTE 1 A quality plan can be comprised of one or several different documents.

NOTE 2 A quality plan can be referred to by other terms and refer to other quality management system documents. Examples of other terms include product quality plan (PQP), inspection and test plan (ITP), manufacturing process specification (MPS), process control plan (PCP), and quality activity plan (QAP).

5.6.3 Process Control Documents

Kings Energy Services shall document process controls. Process controls shall include or reference:

a) requirements for verifying conformance with applicable quality plans (see 5.6.2), API product specifications, customer requirements, and/or other applicable product standards/codes;
b) instructions and acceptance criteria for processes, tests, inspections, and
c) when applicable, customer's inspection hold, witness, monitor, and document review points.

NOTE Process controls can include routings, travelers, checklists, process sheets, or equivalent controls and can be electronic or hard copy.

5.6.4 Validation of Processes (QP8.1)

The Kings Energy Services shall validate processes when the resulting output cannot be verified by subsequent monitoring or measurement, and consequently, deficiencies become evident after the product has been delivered or is in use. Validation shall demonstrate the ability of these processes to achieve planned results.

Validation of processes shall be based on 5.6.4, Item a) or 5.6.4, Item b), as follows:

a) If a product specification identifies specific processes requiring validation, then only those processes specified shall require validation for the applicable product.

NOTE At its discretion, Kings Energy Services can validate other processes in addition to those identified in a product specification.

b) If there is no applicable product specification or the product specification does not identify processes that require validation, then processes requiring validation, if applicable to the product, shall include, at a minimum:

— non-destructive examination (NDE)/nondestructive test (NDT);
— welding;
— heat treating; and
— coating and plating (when identified by the product specification or by the organization as critical to product performance).

Kings Energy Services shall maintain a documented procedure for the validation of processes, including the methods used for review and approval. The procedure shall address:

c) required equipment;

d) qualification of personnel;

e) use of specific methods, including identified operating parameters;

f) identification of process acceptance criteria;

g) requirements for records (see 4.5); and

h) revalidation.

If Kings Energy Services outsources (see 5.5.1.7) a process that requires validation, the organization shall maintain evidence that the requirements of 5.6.4 have been satisfied.

5.6.5 Identification and Traceability (QP11.1)

Kings Energy Services shall:

a) establish and maintain identification throughout product realization, including applicable delivery and post-delivery activities;

b) identify the traceability requirements as specified by Kings Energy Services, the customer, and/or the applicable product specifications;

c) maintain a documented procedure for identification and traceability while the product is under control of Kings Energy Services that addresses:

   1) methods of identification;

   2) when required, information needed for traceability;

   3) requirements for maintenance and/or reapplication of identification and/or traceability; and

   4) actions required to address loss of identification and/or traceability.

   Records (see 4.5) of traceability shall be maintained.

NOTE Product can include components or input (raw) materials.

5.6.6 Inspection/Test Status (QP9.1, QP11.1)

Kings Energy Services shall maintain a documented procedure for the identification of inspection and/or test status throughout product realization that indicates product conformity or nonconformity.

5.6.7 Externally Owned Property (QP11.1)

Kings Energy Services shall maintain a documented procedure for control of externally (including customer) owned property that is incorporated into the product, while the property is under the organization's control. Externally owned property shall include intellectual property and data that are not publicly available. The procedure shall address:

a) identification;

b) verification;

c) safeguarding;

d) preservation;

e) maintenance; and

f) reporting loss, damage, or unsuitability for use to the external owner.

Records for the control and disposition of externally owned property shall be maintained (see 4.5).

5.6.8 Preservation of Product (QP12.1)

Kings Energy Services shall maintain a documented procedure describing the methods used to preserve the product and component parts throughout product realization and delivery. The procedure shall address the following:

a) identification and traceability marking;

b) storage, including the use of designated storage areas or stock rooms;

c) assessment of condition at intervals specified by Kings Energy Services;

d) transportation;

e) handling;

f) packaging; and

g) protection.

Records of the results of assessments shall be maintained (see 4.5).

5.6.9 Inspection, Testing, and Verification

5.6.9.1 General (QP10.1)

Kings Energy Services shall maintain a documented procedure for inspection, testing, and/or verification of product to confirm that requirements have been satisfied.

The procedure shall address:

a) in-process inspection, testing, and/or verification methods and their application (see 5.6.9.2);

b) final inspection, testing, and/or verification methods and their application (see 5.6.9.3); and

c) record(s) creation and retention (see 5.6.9.4).

NOTE In-process and final inspection can be performed as one or more activities. Some product characteristics can require final inspection/verification during product realization.

5.6.9.2 In-process Inspection, Testing, and Verification (QP10.1)

Kings Energy Services shall inspect, test, and/or verify product at planned stages as required by the quality plan (see 5.6.2), process control documents (see 5.6.3), and/or documented procedures. Evidence of conformity with the acceptance criteria shall be maintained.

5.6.9.3 Final Inspection, Testing, and Verification (QP10.1)

Kings Energy Services shall perform final inspection, testing, and/or verification of product in accordance with the quality plan (see 5.6.2), process control documents (see 5.6.3), and/or documented procedures to determine and document conformity of the finished product to the specified requirements.

Unless performed by an automated system (see 5.8.3), personnel other than those who performed or directly supervised the product realization shall perform final acceptance inspection at planned stages of the product realization process.

5.6.9.4 Records

Records of all required inspection, testing, verification, and final acceptance shall be maintained (see 4.5).

5.6.10 Preventive Maintenance (QP7.1)

Kings Energy Services shall maintain a documented procedure for preventive maintenance of equipment used for product realization. The procedure shall address requirements for:
a) type of equipment to be maintained;
b) frequency; and
c) responsible personnel.

Records of preventive maintenance shall be maintained (see 4.5).

NOTE Preventive maintenance can be based on risk, system reliability, usage history, experience, industry recommended practices, relevant codes and standards, original equipment manufacturer's guidelines, or other applicable requirements.

5.7 Product Release (QP10.1)

Kings Energy Services shall maintain a documented procedure to address release of product to the customer. Release shall not proceed until the planned arrangements (see 5.6) have been satisfactorily completed. The organization shall only release product that conforms to requirements or that is authorized under concession (see 5.9.3).

Records shall be maintained to enable identification of the individual releasing the product (see4.5).

5.8 Testing, Measuring, Monitoring, and Detection Equipment (TMMDE)

5.8.1 General (QP7.1)

Kings Energy Services shall determine the testing, measuring, monitoring, and detection requirements and the TMMDE needed to provide evidence of conformity to those requirements.

TMMDE owned and maintained by the organization, employee-owned equipment, and TMMDE from other sources (e.g. third-party, proprietary, and customer-owned) used to provide evidence of product conformity and/ or monitor process parameters identified by the organization that impact product conformance shall be controlled.

TMMDE shall be calibrated at specified intervals. When the specified interval is based on the date of first use, the date of first use shall be documented.

5.8.2 Procedure

Kings Energy Services shall maintain a documented procedure for the control of TMMDE. The procedure shall include requirements for the specific equipment type and shall address:
a) unique identification;
b) calibration status;
c) traceability to international or national measurement standards; where no such standards exist, the basis used for calibration shall be recorded (see 4.5);
d) calibration method and acceptance criteria;
e) frequency of calibration, and when the calibration interval begins;
f) documentation of the calibration measurements prior to adjustment and measurements after any adjustments
during calibration;

NOTE Calibration measurements prior to adjustment can be referred to as ‘as-found’. Calibration measurements after any adjustments can be referred to as ‘as-left’. When no adjustments are made, ‘as-found’ and ‘as-left’ are the same.

g) actions taken to prevent unintended use of TMMDE identified as out-of-calibration, beyond calibration interval, or not in-service;
h) when the TMMDE is found to be out of calibration, an assessment of the validity of previous measurements and actions to be taken on the TMMDE and product, including maintaining records and evidence of notification to the customer (see 4.1.5.2) if suspect product has been shipped;
i) use of third-party, proprietary, employee-owned, and customer-owned TMMDE;
j) maintenance; and
k) suitability for the planned monitoring and measurement activities.

5.8.3 Equipment

TMMDE identified in 5.8.1 shall:

a) be calibrated (see 3.1.3);
b) have the calibration status identifiable by the user prior to and during use;
c) be safeguarded from adjustments or modification that would invalidate the measurement result or the calibration status;
d) be protected from damage and deterioration during handling, maintenance, and storage; and
e) be used under environmental conditions that are suitable for the calibrations, inspections, measurements, and tests being performed.

When used in the testing, monitoring, measurement, or detection of specified requirements, the ability of computer software to satisfy the intended application shall be confirmed prior to initial use and reconfirmed, as necessary.

5.8.4 TMMDE Equipment from Other Sources

When TMMDE is third-party, proprietary, or customer-owned, Kings Energy Services shall confirm the equipment is in calibration prior to use. When limited by customer, contract, or licensing agreement, the requirements of 5.8.2, Item c), 5.8.2, Item d), 5.8.2, Item e), 5.8.2, Item f), 5.8.2, Item j), and 5.8.2, Item k) shall not apply.

5.8.5 Records

Kings Energy Services shall maintain a registry of the TMMDE identified in 5.8.1 that includes a unique identification, specific to each piece of equipment.

Results of calibration per 5.8.2 shall be recorded and maintained (see 4.5).

When calibration of the third-party, proprietary, and customer TMMDE to the requirements of 5.8 is limited by customer, contract, or licensing agreement, the organization shall maintain records (see 4.5) of the limitations imposed.

5.9 Control of Nonconforming Product

5.9.1 Procedure

5.9.1.1 General (QP13.1)

Kings Energy Services shall maintain a documented procedure addressing the controls and related responsibilities and authorities for nonconforming product during product realization and after delivery.

5.9.1.2 Nonconforming Product During Product Realization

The procedure for addressing nonconforming product identified during product realization shall include requirements for:
a) product identification and control to prevent unintended use or delivery;
b) addressing the detected nonconformity (see 5.9.2);
c) taking action to preclude its original intended use or delivery; and
d) authorizing its use, release, or acceptance under concession by relevant authority and, when required, by the customer (see 5.9.3).

5.9.1.3 Nonconforming Product After Delivery

The procedure for addressing nonconforming product delivered to the customer shall include requirements for:
a) identifying, documenting, and reporting nonconforming product;
b) the analysis of nonconforming product, provided the product or documented evidence supporting the nonconformity is available to facilitate the determination of the cause (see 6.4.2);
c) taking action appropriate to the effects, or potential effects, of the nonconformity; and
d) authorizing its use or acceptance under concession by relevant authority and, when required, by the customer (see 5.9.3).

5.9.2 Nonconforming Product

Kings Energy Services shall address nonconforming product by performing one or more of the following:
a) repair or rework with subsequent inspection to meet specified requirements;
b) re-grade for alternative applications;
c) release under concession (see 5.9.3); and/or
d) reject or scrap.

5.9.3 Release of Nonconforming Product Under Concession

The release under concession of nonconforming product that does not satisfy manufacturing acceptance criteria (MAC) shall be permitted when the organization's relevant authority has conducted an evaluation, and authorized release provided that:
a) products continue to satisfy the applicable DAC and customer criteria; or
b) the violated MAC is determined as unnecessary to satisfy the applicable DAC and/or customer

criteria; or

c) the DAC is changed (see 5.4.8) and the affected products satisfy the revised DAC and associated MAC requirements. When the DAC was previously agreed with customer, the DAC change shall be authorized by the customer.

Kings Energy Services shall not release product not conforming to DAC or contract requirements without customer authorization.

5.9.4 Customer Notification of Nonconforming Product

Kings Energy shall notify customers of product not conforming to DAC or contract requirements, that has been delivered. The organization shall maintain records of such notifications (see 4.5).

5.9.5 Records

Records of nonconformities shall be maintained (see 4.5) and shall include:
a) the description of the nonconformity;
b) subsequent actions taken, including concessions obtained;
c) rationale to support release of product under concession (5.9.3); and
d) relevant authority.

5.10 Management of Change (MOC)

5.10.1 General (QF30.1)

Kings Energy Services shall maintain a documented procedure for MOC to maintain integrity of the quality management system when changes occur (see 5.10.2). The MOC procedure shall address:
a) description of, and the need for, the change;
b) availability and allocation of resources (including personnel);
c) potential risks (see 5.3) that may arise from implementing the change;
d) review, approval, and implementation of the change;
e) notifications (see 5.10.3); and
f) verification of the completion of MOC activities and impact on the QMS.

5.10.2 MOC Application

Kings Energy Services shall use MOC for changes that may negatively impact the quality of the product (see 5.3.2.3).

5.10.3 MOC Notification

Kings Energy Services shall notify relevant internal personnel of the change and associated risk. When required by contract, the organization shall notify the customer of the change and associated risk. MOC Notifications shall be documented.

5.10.4 Records

Records of MOC activities shall be maintained (see 4.5).

6 Quality Management System Monitoring, Measurement, Analysis, and Improvement

6.1 General

Kings Energy Services shall plan and implement the monitoring, measurement, analysis, and improvement processes needed to ensure conformity of the quality management system to the requirements of this specification and to continually improve the effectiveness of the quality management system.

Quality management system monitoring, measurement, analysis, and improvement shall include determination
of applicable methods, including techniques for the analysis of data, and the extent of their use.

6.2 Monitoring, Measuring, and Improving

6.2.1 Customer Satisfaction (QP10.1)

Kings Energy Services shall maintain a documented procedure to monitor customer satisfaction. The procedure shall address:
a) the frequency and methods of determining customer satisfaction; and
b) key performance indicators of customer satisfaction.

Records of the results of customer satisfaction information shall be maintained (see 4.5).

6.2.2 Internal Audit

6.2.2.1 General (QP15.1)

Kings Energy Services shall conduct internal audits to provide information on whether the quality management system is implemented, maintained, and conforms to the requirements of this specification and the organization's own quality management system requirements. The organization shall maintain a documented procedure to define responsibilities for planning, conducting, and documenting internal audits.
Kings Energy Services shall identify the audit criteria, scope, frequency, and methods. The planning of audits shall take into consideration the results of previous audits (internal and external), the criticality of the process being audited, and changes made to the quality management system. All processes of the quality management system shall be audited at least every 12 months (not later than the end of the same calendar month as the prior year audit).

NOTE The entire quality management system does not need to be audited at the same time or in one consolidated audit.

When the entire quality management system is not audited as one consolidated audit, the time between audits of each part of the quality management system shall not exceed 12 months.

For those processes performed by the organization and identified as critical to product realization [see 5.6.1, Item b)], audits shall include observation of the activity being performed and evaluate whether the activity conforms with requirements.

6.2.2.2 Performance of Internal Audit (QP15.1)

Audits shall be performed by competent personnel (see 4.3.2.1) independent of those who performed or directly
supervised the activity being audited to ensure objectivity and impartiality of the audit process.

Records of the audits shall provide objective evidence that the quality management system is implemented and
maintained (see 4.5).

NOTE Product specification requirements can be embedded throughout the quality management system processes and audited in conjunction with one or more quality management system processes.

6.2.2.3 Audit Review and Closure (QP15.1)

Kings Energy Services shall identify response times for addressing detected nonconformities. The management personnel responsible for the area being audited shall ensure that any necessary corrections and corrective actions follow the requirements of 6.4.2. Records of internal audits shall be maintained (see 4.5).

6.3 Analysis of Data (QP12.1)

Kings Energy Services shall maintain a documented procedure for the identification, collection, and analysis of data, to demonstrate the suitability and effectiveness of the quality management system. The analysis shall include data generated from monitoring and measurement, internal audits (see 6.2.2), audits of the organization by external parties, management reviews (see 6.5), and other relevant sources.

The data analysis output shall provide information, including trends, relating to:
a) customer satisfaction (see 6.2.1);
b) nonconformity to product requirements during product realization;
c) nonconformities (see 5.9) and product failures identified after delivery or use, provided the product or documented evidence is available to facilitate the determination of the cause:
d) process performance;
e) supplier performance (see 5.5); and
f) achieving quality objectives (see 4.1.3).

Kings Energy Services shall use data to evaluate where continual improvement of the effectiveness of the quality management system can be made.

6.4 Improvement

6.4.1 General (QP15.1)

Kings Energy Services shall continually improve the effectiveness of the quality management system by evaluating, selecting, and implementing opportunities for improvement through the use of the quality objectives, internal audit, analysis of data, corrective action, and management review.

6.4.2 Corrective Action (QP13.1)

Kings Energy Services shall maintain a documented procedure to address nonconformities, including any resulting from customer complaints, and to take corrective actions, both internally and with suppliers. Corrective actions shall be appropriate to the effect(s) of the nonconformity encountered.

NOTE Corrective action can apply to both quality management system processes and nonconforming product trends.

The procedure shall address:

a) criteria for determining when the corrective action process is initiated;
b) reviewing the nonconformity;
c) determining and implementing corrections;
d) identifying the root cause of the nonconformity and evaluating the need for corrective actions;
e) implementing corrective action to reduce the likelihood that a nonconformity recurs;
f) identifying the timeframe and responsible person(s) for addressing corrections and corrective action;
g) verification of the effectiveness of the corrections and corrective action taken;
h) criteria for updating the risks and opportunities identified during planning (see 4.1.4),
i) MOC (see 5.10) when the corrective actions require new or changed controls within the quality management system; and
j) evaluating similar, potential nonconformities and implementing action to reduce the likelihood of occurrence, as appropriate.

Records of corrective action process activities shall be maintained (see 4.5). Records shall identify the activities performed to verify effectiveness of the corrective actions taken.

6.5 Management Review

6.5.1 General (QP10.1)

Kings Energy Services quality management system shall be reviewed at least every 12 months (not later than the end of the same calendar month as the prior year review) by Kings Energy Services management personnel to evaluate the quality management system's continuing suitability, adequacy, and effectiveness. This review shall include assessing opportunities for improvement, adequacy of resources, and the need for changes to the quality management system, including the quality policy and quality objectives.

6.5.2 Input Requirements

The input to management review shall include, as a minimum:

a) status and effectiveness of actions resulting from previous management reviews;
b) results of internal audits (see 6.2.2) and audits of the organization by external parties;
c) changes that could affect the quality management system, including:
   1) changes to legal and other applicable requirements (such as industry standards); and
   2) changes in external and internal issues that are relevant to the quality management system.

d) analysis of customer satisfaction (see 6.2.1);
e) relevant feedback from customers and other interested parties (see 4.1.5);
f) process performance [see 6.3, Item d)];
g) results of risk assessment and the effectiveness of actions taken to address risks (see 5.3);
h) status of corrective actions (see 6.2.2.3 and 6.4.2);
i) analysis of supplier performance (see 5.5);
j) review of the analysis of product conformity, including nonconformities identified after delivery or use (see 5.9);
k) actual performance compared with quality objectives; and
l) recommendations for improvement.

6.5.3 Output Requirements

The output from the management review shall include:
a) a summary assessment of the effectiveness of the quality management system,
b) any required changes (see 5.10) to the processes,
c) decisions and actions,
d) required resources, and
e) any improvement to products in satisfying customer requirements.

Top management shall review and approve the output of management reviews.

Management reviews shall be documented, and records of these reviews shall be maintained (see 4.5).

ANNEX A

Terms and Definitions

The Definitions listed below include or refer to all of the definitions and acronyms of ASME PTC-25 Section 2.0

ABSA – (Alberta Boiler Safety Association) means the pressure equipment safety authority delegated to act as the Alberta jurisdiction for administering the delivery of all safety programs under the Safety Codes Act as it applies to pressure equipment.

Acceptance criteria - Specified limits of acceptability applied to process or product characteristics.

Acceptance or Approval – shall be indicated by written signature and written date, unless specifically indicated otherwise with this QMS.

Acceptance inspection - Demonstration through monitoring or measurement that the product conforms to specified requirements.

Access to a code – means availability for use on the same day as the need for the ASME and applicable codes has been identified.

Act – Means the Alberta Safety Codes Act and the Regulations

Administrator – Administers the pressure equipment discipline and is appointed under the safety codes act.

Alberta Safety Codes Act and Regulations (ASCAR) - The Alberta Safety Codes Act; Statutes of Alberta, Chapter S-l as it applies for pressure equipment and the following regulations adopted by the Province of Alberta, and any amendments to these regulations:

- Pressure Equipment Safety Regulation
- Administrative Items Regulation
- Pressure Equipment Exemption Order
- Pressure Welders Regulation

Alteration - A change in any item described on the original Manufacturer's Data Report, which affects the pressure containing capacity of a pressure vessel, fitting or pressure piping system. Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external) or design temperature of a pressure vessel shall be considered an alteration. A reduction in the minimum temperature shall also be considered an alteration.

LD Service Technician: This position is trained to conduct PRD testing using the ALD device both in house and the field. The ALD service Technician shall also be trained to provide PRD serving of welding in-line valves in a field application.

API – *(American Petroleum Institute) An oil and gas industry trade association. The American Petroleum Institute is involved with public policy and industry lobbying efforts, environmental,

health and safety regulations, training and certification programs, and establishing a variety of industry standards.

AQP – The Alberta Quality Program number issued by ABSA. A company holding a valid Certificate of Authorization Permit from ABSA is issued an AQP number, when applicable.
ASME – American Society of Mechanical Engineers

ASME CODE – The American Society of Mechanical Engineers, Boilers and Pressure Code

a) ASME Boiler and Pressure Vessel Code Section I: Rules for Construction of Power Boilers
b) ASME Boiler and Pressure Vessel Code Section IV Rules for Construction of Heating Boilers
c) ASME Boiler and Pressure Vessel Code Section VIII Rules for Construction of Pressure Vessels
d) ASME Boiler and Pressure Vessel Code Section XIII Rules for Overpressure Protection
e) ASME Code for Pressure Piping, B31.1 Power Piping
f) ASME Code for Pressure Piping, B31.3 Process Piping
g) ASME B10.5 Pipe Flanges and Flanged Fittings
h) ASME B10.9 Factory-Made Wrought Butt Welding Fittings
i) ASME B10.II Forged Fittings, Socket-Welding and Threaded
j) ASME B10.34 Valves-Flanged, Threaded and Welding End
k) ASME B10.36 Orifice Flanges
l) Code and Standards referenced by construction code

These codes provide the rules for new pressure relief valves, while serviced valves are not new, they must meet the requirements of new valves with respect to set pressure, set point tolerance.

Assembler – An organization who, under the guidance of ABSA, ASME and the OEM, purchases or receives from a manufacturer the necessary component parts of valves and assemblies, adjusts, tests, seals, and ships safety or safety relief valves at a geographical location, using facilities other than those used by the manufacturer.

Assist Lift Device – is a device that is used to apply auxiliary load to a PRV stem or spindle to determine the valve set pressure as an alternative to a full pressure test.

ASTM – American Society for Testing and Materials

ASVS – Alberta Safety Valves Servicing. Companies holding a valid certificate of authorization permit for servicing PRVs and are issued an ASVS Number by ABSA.

Authorization Form – This form is used to record customer confirmation. Examples of its use include replacing a valve not in kind, set pressure change, change of capacity and the test only and adjust of PSV's.

Authorized Inspector (AI) - An inspector regularly employed by the ASME accredited Authorized Inspection Agency who has a valid National Board commission and is qualified by written examination in accordance with the ASME QAI-1, and National Board NB-263 RCI-1 standards. The Authorized Inspector is also an ABSA Safety Officer (Boiler and Pressure Vessels) appointed to administer the Alberta Safety Codes Act.

Back Pressure – The pressure existing at the valve outlet and in the downstream portion of the valve body. It may be superimposed, built up, constant or variable. The presence of elevated operating temperature or back pressure does not alter the above definition.

Blowdown- The difference between actual popping pressure of a pressure relief valve and actual reseating pressure expressed as percentage of set pressure or in pressure units.

Built-up Back Pressure – Is the pressure existing at the outlet of a pressure relief device occasioned by the flow through that particular device into a discharge system.

BCSA (British Columbia Safety Authority)-Means the pressure equipment safety authority delegated to act as the jurisdiction in British Columbia for administering the delivery of all safety programs under the Safety Codes Act as it applies to pressure equipment.

BEP- Boiler External Piping; Piping as defined in ASME B31.1, paragraph 100.1.2, which is subject to mandatory inspection by the Authorized Inspector, as defined in ASME Code Section I.

Branch Manager- Is responsible for the planning and directing of all activities pertaining to valve servicing at their branch. The Branch Manager is responsible for all aspects of ALD servicing, both in house and welded in-line valves outside of a Kings facility. The Branch Manager shall provide guidance to the ALD Service Technician by reviewing calibration documents and providing training and technical support. The Branch Manager is the acting onsite Quality Control Inspector at branch locations.

Calibration - Comparison to a standard of known accuracy and making any needed adjustment(s).

CAP – Certificate of Authorization Permit issued by ABSA

Chief Executive Officer (CEO): Is responsible for overseeing all aspects of the company's organizational operations.

C.G.S.B. – Canadian General Standards Board

COA – Certificate of Authorization issued by NB or ASME

Code - Latest Editions and Errata of the following American Society of Mechanical Engineers codes:

Code Seal Pliers – Seal pliers used for sealing ASME approved and non-code valves. Sealing pliers are identified by the color "GREEN" these pliers are inventoried and stored at the sealing bench.

Cold Differential Test Pressure (CDTP) – Is the inlet pressure at which a pressure relief valve is adjusted to open on a test stand. This test pressure includes corrections for service conditions of super imposed back pressure and/or temperature (PTC-25). Computation includes compensation for constant back pressure (if required) and/or inlet operating temperature. "Cold Differential

Test Pressure" is the sum of the "spring selection" and the "increase in setting" to compensate for temperature and back pressure as per the manufacturers specifications.

Collection - Process of obtaining, assembling, and/or organizing applicable information with the intent of meeting the requirements.

Compliance - Act or process of satisfying the legal and other applicable requirements of a regulation or regulatory body.

Constant Back Pressure – Is the static pressure existing at the outlet of a pressure relief device due to pressure in the discharge system.

Construction Drawing - A drawing that has been created from a new or existing design drawing that is or is in the process of being registered and accepted with the applicable Canadian Jurisdiction. The drawing will then be used for fabrication.

Conversion – Is when a PRD is changed from one certified service configuration to another or any changes to the model of the valve. A conversion also includes changes to the set pressure.

Critical - That deemed by the organization, product specification, or customer as mandatory, indispensable or essential, needed for a stated purpose or task, and requiring specific action.

CRN - Canadian Registered Number; registered number allotted by the regulatory authority to designs and specifications when accepted and registered. Canadian Registration Numbers are issued by a pressure equipment jurisdiction in Canada per the requirements of CSA B51 code. A CRN for a PRV may appear as 0G34567.12C. For a PRV CRN to be valid in Alberta must start with "0G" and after the period include a digit "2" or letters "C" or "CL".

Critical Part – Any part of a pressure relief valve that can affect the operation of the valve to open at a specific pressure, or relieve a volume of fluid, or, re-close at a lower pressure, or, it's pressure retaining integrity.

CSA – Canadian Standards Association.

CSAB51 – Canadian Standards Association; latest Edition of B51 Boiler, Pressure Vessel and Pressure Piping Code.

Data Entry Tech- is responsible for the input of required information in Kings Business Manager.

Duplicate Data Plate - is a metal nameplate that is installed when the original nameplate is missing or to replace an illegible nameplate. The replacement is marked "Duplicate".

Delivery - Point in time and physical location at which the agreed transfer of ownership takes place.

Design acceptance criteria - Defined limits placed on characteristics of materials, products, or services established by the organization, customer, and/or applicable specifications to achieve conformity to the product design.

Design Drawing - A Drawing that is or is in the process of being registered with the applicable Canadian Jurisdiction and has been stamped by the applicable Jurisdiction. The drawing is used to facilitate the creation of a construction drawing.

Design validation - Process of proving a design by testing to demonstrate conformity of the product to design requirements.
NOTE: Design validation can include one or more of the following (this is not an all-inclusive list):

a) prototype tests,
b) functional and/or operational tests of production products,
c) tests specified by industry standards and/or regulatory requirements,
d) field performance tests and reviews.

Design verification - Process of examining the result of design and development output to determine conformity with specified requirements.
NOTE: Design verification activities can include one or more of the following (this is not an all-inclusive list):

a) confirming the accuracy of design results through the performance of alternative calculations,
b) review of design output documents independent of activities of design and development,
c) comparing new designs to similar proven designs.

Division Manager– Responsible for quality of work, decision to replace or repair parts or valves, customer contacts, safety of working conditions, training and acting as onsite QC designee.

Division Manager Valves: Is responsible for the quality of work, decision to replace or repair parts or valves, customer contacts, safety of working conditions, training and employee development.

Drawings – The term drawings, when not defined as design or construction in this Quality Management System will be considered both types, design and constructive drawings.

Expansible Fluid – means;

a) any vapour or gaseous substance, or
b) any liquid under pressure and at a temperature at which the liquid changes to a gas, or
c) vapour when the pressure is reduced to atmospheric pressure, or when the temperature is increased to ambient temperature.

First article - Representative sample of a product, component, or output from a process used to verify that prescribed activities have satisfied the requirements as specified by the organization.
NOTE: First Article samples can include trial purchases and prototypes.

Fittings – Mean a valve, gauge, regulating or controlling device, flange, pipe fitting, or any other appurtenance that is attached to, or forms part of, a boiler, pressure vessel, fired-heater pressure coil, thermal liquid heating system or pressure piping system.

IOM- Installation, Operation and Maintenance

ISO- International Organization for Standardization.

Job File - A file which contains all of the records and documents that is essential to ensure the quality of the product. This file shall be assigned the number of each job. This number shall be a means of identifying each job file.

Jurisdiction - As applicable to this Quality Management System (QMS) a Jurisdiction is a governmental entity with the power, right or authority (or an organization delegated this authority by government) to interpret and enforce law, rules or ordinances pertaining to boilers, pressure vessels or other pressure retaining items.

Jurisdictional Requirements- Those requirements of the governing jurisdiction such as

- Alberta Boiler Safety Association ABSA
- Technical Safety BC
- Technical Standards and Safety Authority TSSA
- Technical Safety Authority of Saskatchewan TSASK

Key Performance Indicator – KPI - Quantifiable measure that an organization uses to gauge or compare performance.

KBM – (Kings Business Manager) is the primary business tracking software used by Kings Energy Services. All Kings jobs are started and tracked using this program.

KDM – (Kings Document Manager) is the primary document control software used at Kings Energy Services. This program is used to access the most up to date-controlled documents.

KES – Kings Energy Services Ltd.

Legal requirement - Obligation imposed on an organization, including those that are statutory or regulatory.

Management personnel - Person or group of people, as defined by the organization, who directs and controls all or part of a facility, location, department, or other function; has the fiscal responsibility for the organization and is accountable for ensuring compliance with legal and other applicable requirements.

NOTE: For some organizations, top management (see ISO 9000) and management are the same.

Manager of Operations: Is responsible for all Operational Services throughout Kings Organization the Manager of Operational Services is the person responsible for the overall management of the Pressure Relief Devices Program. The Manager of Operations reports directly to the President.

Manufacturer – A PRD manufacturer in the province of Alberta holding a valid Certificate of Authorization Permit from ABSA. Manufacturers outside of Alberta but within Canada, who want to fabricate PRDs at their locations and ship to Alberta for installation, must be registered with the

local pressure equipment jurisdiction. The manufacturer must also hold a Certificate of Authorization from ASME.

Manufacturing Manager- As related to pressure equipment under this QMS, the Manufacturing Manager is the person responsible for all design functions described by this QMS and for complying with all design rules and requirements of the construction Code. The Manufacturing Manager is responsible for quality of work, decision to replace or repair Pressure equipment, Vessels, piping and fittings

Manufacturing Acceptance Criteria – MAC - Defined limits placed on characteristics of materials, products, and services established by the organization to achieve conformity to the manufacturing or servicing requirements.

Material Test Report (MTR) - A document, in which the results of tests, examinations, repairs, or treatments required by the material specification to be reported are recorded, including those of any supplementary requirements or other requirements stated in the order for the material.

MAWP - Maximum Allowable Working Pressure.
MSDS – Material Safety Data Sheet – See SDS

NB – National Board.

NB-13 – The National board code for the certification of manufacturers, assemblers and devices pertaining to pressure relief devices.

NB-23 - The National Board Inspection Code which covers the rules and guidelines for in-service inspection, repair, and alteration of pressure- retaining items.

New Valve Tag- (Optional) whenever a “New PRD” is supplied and a request for a data tag or VeeBase certificate has been made a “New Valve” tag may be issued. This tag can be used as a date tag and is attached to the valve.

Non-Code Seal Pliers- Are described as seal pliers used for sealing NON-ASME valves that are not approved for Code service. The pliers are identified by the color “RED” and by the letters “NC” on the sealing button of the pliers, these pliers are inventoried and stored at the sealing bench.

Non-Conformance– ASVS - Is described as any defect that renders a valve or valve part unusable. It includes new parts that are outside permitted tolerances, unidentifiable parts, unidentified valves, welded parts and parts that have been manufactured by someone other than the valve manufacturer or his authorized agent. Any other condition which renders an item unacceptable for use because it does not comply with the ASME Code, Safety Codes Act, Manufacturer’s specifications or this Quality Control Manual shall be deemed a Non-Conformance. A nonconformance is also described as any break down of a process or procedure which ultimately has a negative outcome of the intended action.

Nonconformance - Any condition which renders any code item unacceptable or indeterminate for use because it does not comply with the Code, the Alberta Safety Codes Act and Regulations (ASCAR), the Owner's specifications, design specifications or this QMS. Examples of

nonconformities include physical defects, test failures; improper documentation, loss of material identification, and deviations from drawings, specifications or procedures.

Non-Critical Part – The parts of a pressure relief valve that are not involved in the primary function of the valve to open at a specific pressure, relieve a volume of fluid and to re-close at a lower pressure. Examples of Noncritical parts are the blow-down ring locking pin, the lifting lever, and the lifting lever pin.

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. The Owner may also be the customer or client.

Owner's Inspector - Inspector designated by the Owner to verify that all required examinations and testing has been completed. For the inspections of pressure piping systems, he/she shall satisfy himself/herself that the pressure piping system conforms to all applicable Code rules and engineering design requirements (e.g. Refer to ASME B31.3 Chapter I, paragraph 300 and Chapter VI, paragraph 340 for requirements).

Outsource - [outsourced activity] - Function or process that is performed by an external supplier on behalf of the organization.

OEM – Original Equipment Manufacturer.

OJT – On the job training.

Owner/User – 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 the authority of ownership [SCA 1(1)(V)].

P. & I.D. – Process and Instrumentation Diagrams.

PESL – Pressure Equipment Safety Legislation.

PESR – Pressure Equipment Safety Regulation, Alberta regulation 49/1406.

Power Plant –

a) A boiler in which steam or vapours is generated at a pressure greater than 103 kilopascals,
b) A boiler that contains liquid and has a working pressure that exceeds 1103 kilopascals or a temperature that exceeds 121 degrees Celsius, or both, or
c) A system or arrangement of boilers described in (a) or (b), and the pressure vessels, pressure piping systems and fittings used in connection with one or more of the boilers

The President- Is responsible for the management of the organizations operations and reports directly to the CEO. The President will ensure adequate and competent resources are available to successfully implement this quality program and work as an intermediary in the event of conflicts arising from this Quality Manual. In the Presidents absence the CEO will act as designee.

Pressure Piping System - Pressure Piping System means pipes, tubes, conduits, fittings, gaskets, bolting and other components that make up a system for the conveyance of expansible fluid under pressure and may also control the flow of the fluid. The Pressure Equipment Safety Regulation does not apply to pressure piping system that is fully vented or operating with one or more pressure relief device with the set pressure not exceeding 15PSI (103 kPa) and sized so that the operating pressure cannot exceed 15 PSI (103 kPa). The Safety Codes Act and Pressure Equipment Safety Regulation (PESR) do not apply to pressure piping under the jurisdiction of the Alberta Oil and Gas Conservation Act and Regulations or the Alberta Pipeline Act and Regulation (see Alberta Energy Regulator (AER) document “Directive 077 Pipelines Requirements and reference tools”, for interpreting Jurisdictional Relationships for Pipeline, Pressure Equipment, and Pressure Piping). There is also partial exemption from some requirements of the PESR for pressure piping meeting the requirements of PESR paragraph 4(2).

Pressure Vessel –a vessel used for containing, storing, distributing, processing or otherwise handling a material at high pressures

Preventive maintenance - Planned action to minimize the likelihood of equipment failure and unscheduled interruptions.

Procedure - Organization’s documented method for performing an activity under controlled conditions to achieve conformity to specified requirements.

Procedure Qualification Record (PQR) - The document that records what occurred during the welding of a procedure qualification test coupon and the results of testing of the coupon. With the exception of that allowed by ASME Section IX paragraph QW-140.2, changes to procedure Qualification records are not permitted without requalification of the PQR.

PRV – Pressure Relief Valve

PRD – Pressure Relief Device

PSV – Pressure Safety Valve

PTC-25 – Pressure Relief Devices Performance Test Code. This Code provides instructions for flow capacity testing and in-service and bench testing of pressure relief devices.

Purchaser: Orders parts and supplies for all branches and assists in inventory control for the Setting and Servicing of Relief Valves, Safety Valves and Safety Relief Valves.

Quality Control Inspector (QCI) - An Employee of King's Energy Services Ltd. designated by the QHSE Manager to perform the Quality Management System (QMS) duties as defined in this QMS.

The Quality Control Inspector reports through the QHSE Manager to the Director Operational Services on any QMS related issue.

Quality Health Safety and Environmental Manager (QHSE) - An Employee of King's Energy Services Ltd. designated by the President to have the responsibility and authority to maintain a Quality Management System (QMS) and the organizational freedom to recognize QMS problems and to provide solutions to those problems. The QHSE Manager will update top management in regards to any performance issues with the QMS.

Quality Management System (QMS) – Kings Energy Services LTD. Quality Management System is defined by this manual.

Receiver- Is responsible for all products coming into a Kings facility. They are to record all incoming and customer information into the Kings data base. The receiver will ensure parts are received, verified, and labeled.

Registered Design - A Drawing that is or is in the process of being registered with the applicable Canadian Jurisdiction and has been stamped by the applicable Jurisdiction. The drawing is used to facilitate the creation of a construction drawing.

Repair – The work necessary to restore a boiler pressure vessel or piping system to a safe and satisfactory operating condition provided there is no deviation from the original design.

Repaired by Nameplate (Metal)- When PRD service work changes the valve type or model is described as repair. In these circumstances a “Repaired by” Nameplate will be firmly attached to the valve.

Repaired by Tag (Polythermal)-When PRD service work changes the valve type or model and a “Repaired by Nameplate has been firmly attached to the valve, a polythermal tag may also be added when requested.

Repairing a Valve – For intent of use with this manual, any process which changes the valve type or model is described as a repair. A repair involves disassembling, cleaning, inspection, lapping, part replacement, reassembling, resetting and sealing a pressure relief device so that its condition and performance are equivalent to the standard of new valves. A repair may also include the machining of critical replacement parts or any change of capacity or set pressure which constitutes a conversion of a device.
Risk - Situation or circumstance that has both a likelihood of occurring and a potentially negative consequence.

SBO – (Special Boiler Operator) this is a non-standardized certificate of competency issued by ABSA. It is site specific and certifies the operator to supervise a power plant of a capacity not exceeding 250 kilowatts.

SCA – (Safety Codes Act) Province of Alberta Safety Codes Act as it applies for pressure equipment and the following related regulations under the Safety Codes Act.

a) Pressure Equipment Safety Regulation
b) Pressure Equipment Exemption Order

c) Pressure Welders Regulation
d) Administrative Items Regulation

SCO (Safety Codes Officer) - A person appointed by the Administrator of ABSA, to administer the Alberta Safety Codes Act and Regulations.
SDS – Safety Data Sheet (replaces MSDS), is a document that contains information on the potential health effects of exposure to chemicals, or other potentially dangerous substances, and on safe working procedure when handling chemical products.

Service - Performance of an activity by one function or organization for another.

Servicing a Valve – For intent of use with this manual, servicing a valve involves disassembling, cleaning,
inspection, lapping, part replacement, reassembling, resetting and sealing a pressure relief device so its condition and performance are equivalent to the standard for new valves. This does not include any work that will alter the device model or type.

Service Nameplate (Metal) – When a valve is serviced, and the laminated tag is not acceptable to the customer or service condition, the metal service nameplate will be used. The metal nameplate shows at a minimum the date of service and the type/model number of the valve along with the Kings name and the words “Serviced By”.

Service Organization – An organization certified per the requirements of the jurisdiction.

Service Tag (Polythermal) – When a valve is serviced. This tag shows the customer’s name, serial no., set pressure, location of origin, work order number.

Set Pressure – The set pressure is the user’s operating requirement and is usually equal to the Maximum Allowable Working Pressure of the vessel (MAWP)

Set Pressure Definition –Is the value of increasing inlet static pressure at which a pressure relief device displays one of the operational characteristics as defined under opening pressure, popping pressure; start to leak pressure, (The applicable operation characteristic for a specific device design is specified by the device manufacturer). Set Pressure Definition includes:

a) POP - The point when the action of the valve opens with a clear, clean “POP”.
b) First Steady Stream – defines set pressure definition for liquid PRD’s. It is described as the first continuous steady flow of liquid from outlet of valve after initial discharge breaking the vertical plane of the valve discharge flange
c) Initial Heavy Flow – is the continuous flow of liquid from the valve outlet that is of a larger diameter than that of the first steady stream.
d) Heavy Flow
e) Initial Auditable Discharge
f) Start to Leak - First signs of discharge (droplets of water).
g) Bubble

Set Pressure Tolerance – ASME I (PG-72.2): +/- 2 psi (15 kPa) for set pressures up to and including 70 psi, +/- 3% for set pressures from greater than 70 to 300 psi (483 to 1469 kPa), +/- 10 (69 kPa) psi for set pressures greater than 300 to 1000 psi (1469 to 6895 kPa) , +/- 1% of set pressure above 1000 (6895 kPa) psi. ASME IV (HG-401.1[k]): The set pressure tolerances, plus or minus, of safety valves shall not exceed 2 psi (15 kPa), and for safety relief valves shall not exceed 3 psi (14 kPa) for pressures up to and including 60 psi (400 kPa) and 5% for pressures above 60 psi (400 kPa) ASME VIII (UG-134[d]): The set pressure tolerance for pressure relief valves shall not exceed +/- 2 psi (15 kPa) for set pressures up to and including 70 psi (500 kPa) and +/-3% for set pressures above 70 psi (500 kPa).

Shipper: Is responsible for organizing and maintaining control of all items shipped out of Kings facilities.

SNT-TC-1A - Recommended Practice No. SNT-TC-1A. Personnel Qualification and Certification in Nondestructive Testing. The American Society for Nondestructive Testing, Inc. Latest ASME Code of construction accepted Edition.

SRV – Safety Relief Valve

Superimposed Back Pressure – Is the static pressure existing at the outlet of a pressure relief device at the time the device is required to operate. It is the result of pressure in the discharge system from other sources.

Team Lead-PSV: Is responsible for updating OEM shop manuals, calibration logs and ensuring all applicable codes and manufacturer's specifications are followed. The Team Lead-PSV is also responsible for maintaining quality of personnel and ensuring standards of work and training are met. The Team Lead-PSV reports to the Department Manager-Valve service or Division Manager Valves and will also act as onsite Quality Control Inspector.

Test Only – The mounting of a safety, safety relief or relief valve on the test stand and verify the set pressure of the valve without dismantling of the valve. This service may include adjustment of the set point.

Test Only Tag – A test only tag is attached to a valve when the PRD is tested but not otherwise repaired.

Tester: Is an individual trained and deemed competent in the understanding and use of pressure testing equipment. The Tester is to have adequate experience testing pressure relieving devices under the guidance of the Branch Manager, Team Lead-PSV or Designated Trainer.

Technical Quality Trainer: Responsible for providing training and documentation to valve shop technicians so that pressure relief valves are repaired and serviced according to the Kings Energy Quality Control Manual and manufacturer's specifications. This duty will mainly be performed by a qualified senior level technician as well as qualified managers.

TSASK- Technical Safety Authority of Saskatchewan. . The TSASK is the jurisdictional authority governing the Saskatchewan Safety Codes Act as it applies to this manual.

TSSA- Technical Standards and Safety Authority. The TSSA is the jurisdictional authority governing the Ontario Safety Codes Act as it applies to this manual.

Valve Technician – Is responsible for the initial inspection of valves, teardown, cleaning of parts, lapping of seats, replacing parts as necessary, re-assembly and testing of valves.

VeeBase – PSV serving program used by Kings Energy Services

VeeBase Traveler – Is used to record the required valve servicing, the observations of the valve inspection, the service work performed and the final valve settings.

Welder - Within this QMS, unless specifically differentiated as Welding Operator(s), Tack Welders and Welders shall be understood to include Welder(s) [an individual who performs manual or semiautomatic welding] and Welding Operator(s) [an individual who operates machine or automatic welding equipment].

Welding Procedure Specification (WPS) - The document that describes in detail all of the variables which are essential, supplementary essential, and non-essential to the welding process as specified by the ASME Code to provide direction to the welder or welding operator for making production welds in accordance with Code requirements. The WPS may be revised if there is a change in a non-essential variable. Any change to an essential or supplementary essential variable requires re-qualification of the WPS. (i.e., new or additional PQRs to support the change in essential or supplementary essential variables).

ANNEX B

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ANNEX C

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ANNEX D

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ANNEX E

Technical Standards and Safety Authority Addendum Rev 10.0

COVER PAGE

1 Scope

Kings Energy Service's Quality Management System addendum scope for Ontario is described as:
Repair of Section I and XIII ASME Code stamped valves in accordance with NBIC Part 4, CSA-B51, Boiler, Pressure Vessel and Piping code, and the Technical Standards and Safety Authority Safety Codes Act and Regulations. Special processes are limited to machining.
Test media shall include Air, Liquid & Steam

Adopted

By

KINGS ENERGY SERVICES LTD.

Quality Manual

For both the field and following site address

Sarnia

1018 Prescott Drive Unit#2

Sarnia, ON

N7T-7H3

MANUAL #

Issued To

Annex E

Technical Standards and Safety Authority Addendum

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Technical Standards and Safety Authority Addendum

SV3 Manual Control and Revisions

3.0 Scope

The purpose of this section is to provide the system for preparing, revising and the control of this Quality Control Manual.

3.1 Responsibilities

3.1.1 The QHSE Manager is responsible for;

- The control and implementation of the Technical Standards and Safety Authority Quality Management System and this manual
- The annual review of the Quality Management System following QP16.1 Management Review
- Uploading the Quality Manual on to Kings Document Manager platform
- Distribution of the Quality Manual to the TSSA's main office

3.2 Review

In order to remain up to date and effective and be in compliance with jurisdictional requirements, an annual review (SV3 3.1.1) of this manual will be conducted by the QHSE Manager and members of senior management. In the event of receiving any code edition, a review of the manual will take place within 60 days to confirm the changes by revising the manual as necessary and documented. (See SV3 3.3)

3.3 Revisions

The Quality Management System is an ever-changing document. Changes to the code or legislation or improvements in practice and procedures may require additions to this manual. The QHSE Manager will forward revision changes to the Director Operational Services for assessment and approval. Once the Director Operational Services signs off on the recommended changes, all revisions are then sent to the TSSA for their acceptance and sign off prior to implementation**.** The QHSE Manager will then distribute revisions to each controlled manual holder.

3.3.1 Revision Log

All revisions will be documented on a Revision Log **(SV19 18.0)** and kept with the QHSE Managers files. The Revision Log is to be signed by the Director Operational Services. The log will accompany the revisions to the TSSA to be signed off by a TSSA Representative when the revisions are approved.

3.4 Document Transmittal Letter

At any time when manual revisions, or any other documentation moving through the Kings Energy Services quality management system requires control and their receipt must be acknowledged, QF1.2 Document Transmittal **(SV19 16.0)** Letters regarding the latest editions or revisions.

The Document Transmittal letter will accompany the document(s). The letter will contain reference of the new document or changes to existing documents and is to be signed by the intended recipient and returned to the QHSE Manager within 5 working days for confirmation and filing.

3.5 Revision Identification

The revision number and date is to be shown on each page of the manual and other controlled documents. The revision number is located in the header and clearly marked as an example "Rev 1.0". The revised section(s) in this manual are to be indicated by a blue line placed next to the revision in the left-hand margin. A summary of the change is to be included in the revision summary and the Document Transmittal Letter.

3.6 Revision Summary

Date	Section	Revision	Description of Revision
11.1.14	SV1 to SV13 (All sections)	0	New edition
23-03-2021	SV1 to SV13 (All sections)	9	Complete revision to meet TSSA Recertification audit
24-07-2024	SV1 to SV13 (All sections)	10	Complete revision to meet TSSA Recertification audit.
24-08-08	SV1 to SV13 (All sections)	10.1	Final Revisions for TSSA Recertification Audit

3.7 Records Retention

All documents pertaining to testing and servicing of Pressure Relief Devices will be maintained and kept for a minimum of 5 years. This is the responsibility of the Division Manager.

Annex E

Technical Standards and Safety Authority Addendum

SV4 Definitions

Act – Means the Technical Standards and Safety Authority Standards Act and the Regulations

ASME – American Society of Mechanical Engineers.

ASME CODE – The American Society of Mechanical Engineers, Boilers and Pressure Code

Section I	Rules for Construction of Power Boilers
Section IV	Heating Boilers
Section VIII	Rules for Construction Pressure Vessels
Section XIII	Rules for Overpressure Protection

These codes provide the rules for new pressure relief valves, while serviced valves are not new, they must meet the requirements of new valves with respect to set pressure, set point tolerance.

Access to a code – means availability for use on the same day as the need for the ASME and applicable codes has been identified.

API – *(American Petroleum Institute) An oil and gas industry trade association. The American Petroleum Institute is involved with public policy and industry lobbying efforts, environmental, health and safety regulations, training and certification programs, and establishing a variety of industry standards.

Assist Lift Device (ALD) –Is a device that is used to apply auxiliary load to a PRV stem or spindle to determine the valve set pressure as an alternative to a full pressure test.

Authorization Form – This form is used to record customer confirmation. Examples of its use include replacing a valve not in kind, set pressure change, change of capacity and the test only and adjust of PSV's

Back Pressure – Is the pressure existing at the valve outlet and in the downstream portion of the valve body. It may be superimposed, built up, constant or variable. The presence of elevated operating temperature or back pressure does not alter the above definition.

Boiler Safety Officer- Also known as the TSSA Inspector or authorized inspector is someone appointed by the Chief Technical Manager of the Technical Standards and Safety Authority to administer the Technical Standards and Safety Authority Standards act and Regulations.

Built-up Back Pressure – Is the pressure existing at the outlet of a pressure relief device occasioned by the flow through that particular device into a discharge system.

Code Seal Pliers – Seal pliers used for sealing ASME approved and non-code valves. Sealing pliers are identified by the color "GREEN" these pliers are inventoried and stored at the sealing bench.

Cold Differential Test Pressure (CDTP) – Is the inlet pressure at which a pressure relief valve is adjusted to open on a test stand. This test pressure includes corrections for service conditions of super imposed back pressure and/or temperature (PTC-25). Computation includes compensation for constant back pressure (if required) and/or inlet operating temperature. "Cold Differential Test Pressure" is the sum of the "spring selection" and the "increase in setting" to compensate for temperature and back pressure as per the manufacturers specifications. .

An increase in temperature causes a reduction in set pressure (popping pressure) of a safety valve or safety-relief valve. The primary factors are the linear expansion of the body and bonnet (or yoke), which reduces the spring loading, and the direct effect of temperature on the spring itself.

Consequently, it is customary to compensate for this effect by increasing the setting when a valve is set at ambient conditions on a test stand and it is intended for a higher operating temperature in service. The adjustment is approximate and might be outweighed by other differences caused by variations in media and blow-down ring adjustments. Compensation for temperature as an independent variable improves the accuracy of the setting. This assures popping within code tolerances.

It is not recommended to reduce a spring setting for valves intended for sub-zero service. This policy of not compensating such valves, places the popping error toward the high side thus avoiding operational difficulties.

Process type safety-relief valves shall show the cold setting on the main nameplate, compensation being made and cold setting stamped whenever the customer's order specifies a temperature above 250 degrees F. However, when a safety-relief valve is specified for power boiler service the stamping is omitted.

Constant Back Pressure – Is the static pressure existing at the outlet of a pressure relief device due to pressure in the discharge system.

Conversion – Is when a PRD is changed from one certified service configuration to another or any changes to the model of the valve. A conversion also includes changes to the set pressure.

CRN – Canadian Registration Numbers are issued by a pressure equipment jurisdiction in Canada per the requirements of CSA B51 code. A CRN for a PRV may appear as 0G34567.12C. For a PRV CRN to be valid in Ontario must start with "0G" and after the period include a digit "5" or letters "C" or "CL".

Critical Part – Any part of a pressure relief valve that can affect the operation of the valve to open at a specific pressure, or, relieve a volume of fluid, or, re-close at a lower pressure, or, it's pressure retaining integrity.

CSA – Canadian Standards Association.

Data Entry Tech- is responsible for the input of required information in Kings Business Manager.

Duplicate Data Plate - is a metal nameplate that is installed when the original nameplate is missing or to replace an illegible nameplate. The replacement is marked "Duplicate".

Fittings – Mean a valve, gauge, regulating or controlling device, flange, pipe fitting, or any other appurtenance that is attached to, or forms part of, a boiler, pressure vessel, fired-heater pressure coil, thermal liquid heating system or pressure piping system.

KBM – (Kings Business Manager) is the primary business tracking software used by Kings Energy Services. All Kings jobs are started and tracked using this program.

KDM – (Kings Document Manager) is the primary document control software used at Kings Energy Services. This program is used to access the most up to date controlled documents.

KES – Kings Energy Services Ltd.

MAWP - Maximum Allowable Working Pressure.

Director Operational Services: Is responsible for all aspects of valve servicing throughout the Kings Organization. The Director Operational Service reports directly to the President.

NB – National Board.

NB-13 – The National board code for the certification of manufacturers, assemblers and devices pertaining to pressure relief devices.

NB-23 - The National Board inspection code which covers the rules and guidelines for in-service inspection, repair, and alteration of pressure- retaining items.

New Valve Tag- (Optional) whenever a “New PRD” is supplied and a request for a data tag or VeeBase cert has been made a “New Valve” tag may be issued. This tag can be used as a date tag and is attached to the valve.
Non-Code Seal Pliers- Are described as seal pliers used for sealing NON-ASME valves that are not approved for code service. The pliers are identified by the color “RED” and by the letters “NC” on the sealing button of the pliers, these pliers are inventoried and stored at the sealing bench.

Non-Conformance– Is described as any defect that renders a valve or valve part unusable. It includes new parts that are outside permitted tolerances, unidentifiable parts, unidentified valves, welded parts and parts that have been manufactured by someone other than the valve manufacturer or his authorized agent. Any other condition which renders an item unacceptable for use because it does not comply with the ASME Code, Safety Standards Act, Manufacturer’s specifications or this Quality Control Manual shall be deemed a Non-Conformance. A non-conformance is also described as any break down of a process or procedure which ultimately has a negative outcome of the intended action.

Non-Critical Part – The parts of a pressure relief valve that are not involved in the primary function of the valve to open at a specific pressure, relieve a volume of fluid and to re-close at a lower pressure. Examples of Non-critical parts are the blow-down ring locking pin, the lifting lever, and the lifting lever pin.

OEM – Original Equipment Manufacturer.

OJT – On the job training.

Owner/User – 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 the authority of ownership

Provincial Safety Manager – Administers the pressure equipment discipline and is appointed under the safety codes act.

PRV – Pressure Relief Valve.

PRD – Pressure Relief Device

PSV – Pressure Safety Valve

PTC-25 – Pressure Relief Devices Performance Test Code. This Code provides instructions for flow capacity testing and in-service and bench testing of pressure relief devices.

President- Is responsible for overseeing the organizational operations. All personnel report to the president regarding the function, training, and servicing of pressure relief valves.

Quality Management System (QMS) – The means of directing and controlling an organization regarding its quality.

QCM – QHSE Manager – Monitors the QMS to update the manual and procedures as they apply to all governing codes and the policies and practices of Kings Energy Services Ltd.

Repaired By Nameplate (Metal)- When PRD service work changes the valve type or model is described as a repair. In these circumstances a “Repaired By” nameplate will be firmly attached to the valve.

Repairing a Valve – For intent of use with this manual, any process which changes the valve type or model is described as a repair. A repair involves disassembling, cleaning, inspection, lapping, part replacement, reassembling, resetting and sealing a pressure relief device so that its condition and performance are equivalent to the standard of new valves. A repair may also include the machining of critical replacement parts or any change of capacity or set pressure which constitutes a conversion of a device.

Technical Safety Standards Act (TSSA)- In the Province of Ontario the Safety Standards Act applies code and regulations for pressure equipment.

SDS – Safety Data Sheet (replaces MSDS), is a document that contains information on the potential health effects of exposure to chemicals, or other potentially dangerous substances, and on safe working procedures when handling chemical products.

Servicing a Valve – For intent of use with this manual, servicing a valve involves disassembling, cleaning, inspection, lapping, part replacement, reassembling, resetting and sealing a pressure relief device so its condition and performance are equivalent to the standard for new valves. This does not include any work that will alter the device model or type.

Service Organization – An organization certified by the Technical Standards and Safety Authority.

Service Nameplate (Metal) – When a valve is serviced and the laminated tag is not acceptable to the customer or service condition, the metal service nameplate will be used. The metal nameplate shows at a minimum the date of service and the type/model number of the valve along with the Kings name and the words “Serviced By”.

Set Pressure – The set pressure is the user’s operating requirement and is usually equal to the Maximum Allowable Working Pressure of the vessel (MAWP)

Set Pressure Definition –Is the value of increasing inlet static pressure at which a pressure relief device displays one of the operational characteristics as defined under opening pressure, popping pressure; start to leak pressure (The applicable operation characteristic for a specific device design is specified by the device manufacturer)

Set Pressure Definition includes

- POP - The point when the action of the valve opens with a clear, clean “POP”.
- First Steady Stream – *defines set pressure definition for liquid PRD’s. It is described as the first continuous steady flow of liquid from outlet of valve after initial discharge breaking the vertical plane of the valve discharge flange.
- Initial Heavy Flow – is the continuous flow of liquid from the valve outlet that is of a larger diameter than that of the first steady stream.
- Heavy Flow
- Initial Auditable Discharge -
- Start to Leak - First signs of discharge (droplets of water).
- Bubble
- 40cc Method
- Etc.

Set Pressure Tolerance –

ASME I (PG-72.2): +/- 2 psi (15 kPa) for set pressures up to and including 70 psi, +/- 3% for set pressures from greater than 70 to 300 psi, +/- 10 psi for set pressures greater than 300 to 1000 psi, +/- 1% of set pressure above 1000 psi.

ASME IV (HG-401.1[k]): The set pressure tolerances, plus or minus, of safety valves shall not exceed 2 psi (15 kPa), and for safety relief valves shall not exceed 3 psi (14 kPa) for pressures up to and including 60 psi (400 kPa) and 5% for pressures above 60 psi (400 kPa)

ASME VIII (UG-134[d]): The set pressure tolerance for pressure relief valves shall not exceed +/- 2 psi (15 kPa) for set pressures up to and including 70 psi (500 kPa) and +/-3% for set pressures above 70 psi (500 kPa).

SRV – Safety Relief Valve

Superimposed Back Pressure – Is the static pressure existing at the outlet of a pressure relief device at the time the device is required to operate. It is the result of pressure in the discharge system from other sources.

Test Only – The mounting of a safety, safety relief or relief valve on the test stand and verify the set pressure of the valve without dismantling of the valve. *This service may include adjustment of the set point.

Test Only Tag – A test only tag is attached to a valve when the PRD is tested but not otherwise repaired.
Trainer: Is responsible for providing training and documentation to valve shop technicians so pressure relief valves are repaired and serviced according to the Kings Energy Quality Control Manual and manufacturer's specifications.

Team Lead-PSV – Responsible for updating shop manuals, insuring Manufacturer's specifications are followed, reporting any nonconformance to the QHSE Manager and maintaining the quality of work performed by personnel and ensuring standards are met.

Valve Technician – The trained personnel employed to service or repair PRD's at authorized Kings Energy Services repair facilities. This position has four levels of training and abilities.

VeeBase – PSV serving program used by Kings Energy Services

VeeBase Traveler – Is used to record the required valve servicing, the observations of the valve inspection, the service work performed and the final valve settings.

Annex E

Technical Standards and Safety Authority Addendum

SV5 Statement of Authority

STATEMENT OF AUTHORITY

5.0. PURPOSE AND SCOPE:

The purpose of the Quality Management System (QMS) Manual is to establish the scope for servicing, repairing and setting of Relief Valves, Safety Valves and Safety Relief Valves at Kings Energy Services Alberta, British Columbia and Ontario locations. These controls include non-code valves, valves stamped with the A.S.M.E. “V”, “HV” or UV symbols or N.B. stamp, or otherwise approved by Jurisdictional Regulations.

5.1. RESPONSIBILITIES:

5.1.1 QHSE Manager:

The QHSE Manager is appointed by management to administer this system and has the full support of management. The QHSE Manager is responsible for revisions to this manual. No changes will be in conflict with all relevant Provincial Regulations, Safety Codes Acts, and Applicable Codes

The QHSE Manager will have sufficient and well defined authority and responsibility to identify, recommend, and initiate solutions to QMS problems. Management will ensure adequate resources such as trained personnel are provided to implement the program. The QHSE Manager will review this manual annually and document the outcome of the review.

5.1.2 Division Manager East:

The Division Manager-East is to review and approve all revisions. The Division Manager-East will insure compliance to the Quality Management System and to work as an intermediary in resolving issues arising from the Quality Management System. The Division Manager East will assist the QHSE Manger in the annual review of the QMS.

5.2. RESOLUTION:

Whenever the QHSE Manager cannot resolve any quality system problems or conflicts of opinion, the issue will be presented to the President for final resolution. The final resolution will not compromise TSSA Safety Standards Act and Regulations, ASME and all other applicable and provincial codes, or this program.

Department Managers- Valve Servicing, and Team Lead-PSV will serve as a Quality Control Inspector (QCI) for their location and will report to the QHSE Manager in matters under the jurisdiction of this quality management system.

Scott Fraser — President — 22-Jul-2024

Scot Poland — Division Manager-East — 22-Jul-2024

Annex E

SV6 Organization chart

Annex E

Technical Standards and Safety Authority Addendum

SV7 Scope of Work

7.0 Scope

KINGS ENERGY SERVICES LTD. (KES) holds a certificate of authorization for shop services, including the servicing, repairing, setting, machining, and testing of non-code and ASME code relief valves, safety valves, and safety relief valves. All PRD repairs are conducted in accordance with this manual and the Technical Standards and Safety Authority Standards Act.

7.1 Scope of Work- Sarnia

Sarnia (Size and Pressure range)
1018 Prescott Dr. Unit #2

SARNIA, ONT

N7T-7H3

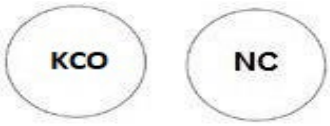
The scope of work at this location includes Steam Testing and machining.

The Division Manager is responsible for Quality Control and reports the Director Operational Services.

- N.B. /A.S.M.E. Air/vapor valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO 1 using air/nitrogen.
- NON-CODE Air/vapor valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO 1 using air/nitrogen.
- N.B. /A.S.M.E. Liquid valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench # CO 2 using water.
- N.B. /A.S.M.E. & NON-CODE Liquid valves up to 8" NPS with a maximum setting of 1,980 psi will be tested on bench #2 using water.
- N.B. /A.S.M.E. CODE Steam valves up to 8" NPS with a maximum setting of 400 psi will be tested on bench # CO2 using steam.
- For any valves requiring set pressures exceeding the limitation of the Bench scope, the ALD can be used in conjunction to achieve the required acceptance criteria
- For any valves requiring Leak Testing for pressures exceeding the scope of the Test Bench / Boiler; The Assisted Lift Device will be used in conjunction to achieve the required acceptance criteria. Consult the QF9.36 Ventil Pre-Vent Test Force Chart for ALD limits and load cell selection.

Valves in steam service maybe repaired at this location, however final set pressure must be verified at a National Board or a TSSA accredited facility

SARNIA Seals



7.2 Responsibilities

7.2.1 Division Manager;

Division Manager: is responsible for ensuring all work at their location is within the scope that is defined within this manual.

7.2.2 QHSE Manager;

The QHSE Manger is responsible for working with the appropriate Manager to define and periodically review the scope of work to the locations abilities and needs.

7.3 Procedure

Work will only be undertaken by trained personnel and will comply with the appropriate codes and regulations in accordance to the Technical Standards and Safety Authority Standards Act , the Technical Standards and Safety Authority, this Quality Control Manual and Manufacturers specifications.

7.3.1 Code Valves

Valves stamped with the ASME code symbol stamp will be serviced, set and sealed at the points of adjustment. The seal pliers for ASME code stamped valves are location specific and identified by the color green and by the insert identification seals, KCO

7.3.2 Non-Code

Pressure relief valves that are not stamped with an ASME code symbol may be serviced, set and sealed at the adjustment points provided that the lead seal has the service location and is identified by the letters “NC” (NON- CODE) (See section 3.12) on the reverse side of the company sealing pliers. The owner is notified that the valve is non-code and may not be acceptable for service in pressure systems under the jurisdiction of the Technical Standards and Safety Authority Standards Act and Regulations. Service & Test Reports will indicate the valve is for non-code service. Non- Code sealing pliers will be identified by the color Red.

7.4 Exemptions

There will be no manufacturing of critical parts. Non-critical parts may be repaired.

7.4.1 Weld Repair

Weld repair is not authorized at this location.

7.5 Part Replacement

Replacement parts will be original as supplied by the manufacturer or an approved distributor. Non-critical parts may be manufactured by Kings Energy Services Ltd.

7.5.1 Critical Part

A Critical Part is described as any part of a PRV that can affect the operation of the valve to open at a specific pressure or relieve a volume of fluid or reclose at a lower pressure or maintaining its pressure retaining integrity.

7.5.2 Non-Critical Part

A Non-critical Part is described as any PRV component that does not affect the operation/reliving, etc. of a PRV. These items include lift lever washers, pins, outlet weather protection caps, cap set screws, and other exterior components.

7.6 Steam Testing

It is a code requirement to verify steam valves with steam. The servicing and testing of Steam Valves will take place at this location.

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Technical Standards and Safety Authority Addendum

SV8 Drawings and Specifications

8.0 Scope

External and internal documents must be identified and their distribution controlled. The purpose of this section is to outline the system and procedures in place for the control of code books, OEM manuals and other required documents and forms within Kings Energy Services

8.1 Responsibilities

8.1.1 Division Manager/Team Lead- PSV is responsible for but not limited to;

- Ensuring the most recent forms and documents are being utilized
- Ensuring OEM hard copy service manuals are up to date
- Repair manuals are accessible to technicians
- Record maintenance
- Work with the QCM to identify errors or areas of improvement

8.1.2 QHSE Manager is responsible for but not limited to;

- Periodic reviews of OEM repair manuals with the Division Manager or Team Lead-PSV to ensure the resources being accessed are the most current.
- Manage OEM electronic library
- Regular review of KDM documents and format
- Periodic review of documents and forms for relevance
- Assist in the review of documents and forms for accuracy
- Updating Greenbook literature

8.1.3 Manufacturing Engineer is responsible for but not limited to;

- Updating and maintaining access to ASME and National Board code books

8.1.4 Division Manager-East is responsible for but not limited to;

- The review of new documents for relevance and accuracy prior to implementation.
- The review of revised documents for relevance and accuracy prior to implementation.
- Assisting in reviews of this management system and existing documents and forms

- Assisting in developing of internal company procedures and specifications used for valve repair, inspection & testing.

8.2 OEM Service Manuals

The original equipment manufacturers repair manuals are subject to change. To ensure the information being accessed is the most current technicians are requested to consult OEM literature and manuals online from the manufacturer's website, should the hard copy manuals be found to be out of date.

An annual review of printed manuals and documents is necessary. It is the Division Manager-East /Team Lead - PSV duty to ensure OEM literature is current. This material must be up to date and documented on the Manufacturers Critical Dimension and Maintenance Manual Review Log and available to all technicians who may require the information to carry out their duties.

8.2.1 Electronic Copy

Whenever the Division Manager/Team Lead - PSV updates an OEM Manual, a copy (PDF) of the original manufacture's material will be sent to the QHSE Manager to be added to the Electronic Library. This library is accessible through the Document Manager program. The QHSE Manager will document the update on an electronic log to be housed with the manual files

8.2.2 Hard Copy

Division Manager-East /Team Lead - PSV will annually review OEM hard copy manuals. The Division Manager-East /Team Lead - PSV will replace the outdated obsolete copies in their libraries. The new copy will be stamped as "Uncontrolled if Printed" and dated and placed in the hard copy library. The updated version will be noted on the Manufacturers Critical Dimension and Maintenance Manual Review Log which is to remain at the front of the manual or specific section for easy access and reference.

8.2.3 Obsolete Maintenance Manuals (Hard Copy)

Obsolete repair manuals maybe kept as part of the PRD repair library. Hard copies will be marked as "Reference Only". "Reference Only" means no further updates are available. When a document is stamped with "Uncontrolled if Printed" it announces that an up to date version may be available. This action will be noted in the log.

8.2.4 Obsolete Maintenance Manuals (Electronic)

Outdated electronic versions will be managed by the QHSE Department in a log kept with the library files. A file marked “Obsolete” will be included, this will be used as storage for outdated documentation.

8.2.5 GreenBook Industry Literature

The GreenBook Industry Literature binders are numbered and controlled. The QHSE Manager is to review and update annually if required.

8.3 Manufacturers Critical Dimension and Maintenance Manual Review Log

When the Division Manager-East /Team Lead- PSV makes additions to their OEM critical dimension library the changes must be documented in a Manufacturers Critical Dimension and Maintenance Manual Review Log. These documents will be reviewed annually to assure access to the most current OEM information.

8.4 Code Books

Knowledge of and access to up-to-date code books is required as a guide line to how this organization is allowed to function in the repair of pressure relief devices. This material will be kept up to date by the Manufacturing Engineer. The QHSE Manager will work with the Engineering department and document the information to include as part of this QMS and Greenbook training documents.

8.4.1 Reference material requiring review for updates to the Quality Manual

- ASME Section I, XIII Code sections
- ASME PTC-25 Pressure Relief Devices Performance Test Code
- CSA-B51
- NB-13 Pressure Relief Valve certifications
- NBIC 23 National Board Inspection Code
- ASME/ANSI B10.5
- API-527 Seat Tightness
- TSSA Safety Information Bulletin SB00-3

8.4.2 Code Book Edition Revision Log

When changes have been made and new codes books have been added, the QHSE Manager will notify the manufacturing engineering department who will make changes to the Code Book Edition Revision Log. The Code Book Edition Revision Log is managed and controlled by the Manager of Manufacturing.

8.5 NB-13 National Board Pressure Relief Device Certifications

NB-13 includes information on all PRDs certified by National Board. NB-13 information includes

- Manufacturer
- Certification number
- Design Number
- Type of PRD
- ASME Code of Construction
- Test Medium
- Set Pressure definition and blowdown

NB-13 is updated monthly from the National Board website. To ensure access to the most up to date versions technicians shall include a website link on the required computer work station. Downloaded versions are allowed but must be controlled. In the event downloaded copies are being used, the Floor foreman shall review the file and update NB-13 monthly. All outdated copies must be deleted.

8.6 Internal Documents

Documents and forms that require control within the Kings Energy Services system are the responsibility of the QHSE Manager and identified as per Quality Procedure QP1.0 (Document Control). These documents will be assessable through the Document Manager Control software and marked clearly with

- The title of the document or form
- Disclosure category
- Author
- Matrix ID
- Approved by
- Revision number
- Revision date
- The replaced document (when applicable)

8.6.1 Access to Controlled Documents

Controlled documents will be access through Document Manager attached to the KBM menu.

Internal Documents which are controlled through the Quality Management System include but not limited to

- Forms
- Procedures
- Work Instructions

These documents will be acknowledged in the King's Document Manager under the index tab.

8.7 Revision of Internal Documents

Internal documents will be reviewed periodically by management for relevance and accuracy in their role and function in the Quality Management System. Any change requests will be brought to the QHSE Manager who is responsible for the revision process.

8.8 File Retention

Kings Energy Services maintains a file history for all documents relating to the inspection and servicing of PRD,s for no less than 5 years.

Annex E

Technical Standards and Safety Authority Addendum

SV9 Parts Control

9.0 Scope

This section defines the procedures, controls and acceptance when procuring and issuing component parts for the servicing of Relief Valves, Safety Valves and Safety Relief Valves at Kings Energy Services Ltd.

9.1 Responsibility

9.1.1 Purchaser is responsible for;

- Taking parts orders
- Verifying order information
- Issuing PO's
- Ordering required product

9.1.2 Receiver is responsible for;

- Confirmation goods ordered are goods received
- Confirm all PRD's and parts are labeled and/or tagged with the correct part number as per this QMS

9.1.3 Team Lead-Purchasing and Inventory Control is responsible for;

- Confirm all PRD's and parts are labeled or tagged with the correct part number
- Placing new stock at the appropriate stock locations (Shelves, Drawers, etc.)
- Confirming inventory counts are correct
- Maintaining the Inventory Data Base

All parts must be traceable from the time of order, to receiving, and through the service process.

9.2 Parts Ordering

Parts will be ordered by the Purchaser with approval from the applicable manager. A ERP Order will be submitted to the purchaser containing proper manufacturer's name plate information and parts. A Purchase Order will be used by the purchaser to order the manufacturer's parts for the specific valve(s).

9.3 Specifications

All parts used during the service of Relief Valves, Safety Valves and Safety Relief Valves are to be new and supplied by the OEM or an OEM approved vendor and to the specifications governed by A.S.M.E., Code requirements per ASME PG 73.3.3 Section I and UG136 (b) (3) and (b) (4) Section VIII Division I.

9.4 Purchasing Responsibility and MTR's

All purchasing of Code parts for PRD's will be under the direction of the Purchasing Manager. All such material will conform to the requirements as stated above. Any components requiring Material Test Reports must be addressed to the vendor at time of order. MTR's are to be scanned to the corresponding Tracker job and the originals will stay with the product. A copy of the MTR will be attached to the PO and remain part of the hard copy file.

9.5 Vender Approval

For the purpose of establishing a perspective of a manufacturing or service vendor's ability to meet company criteria, the Purchasing Department may perform a supplier evaluation by one or more of the following methods.

- Review of suppliers QA/QC Manual
- Source evaluation at the suppliers' facility
- Approval of first article or material by Kings receiving inspection.

9.6 Vendor Inspection

All purchased parts or materials shall be inspected by the vendor for conformance to the purchase order. Documentation such as material test reports, NDE reports, etc. shall be scanned to the corresponding Tracker job and the originals will stay with the product, by the Shipper/Receiver. Copies will be attached to the PO and remain part of the hard copy file.

When deficiencies are noted Kings Energy Services Ltd. shall perform an on-site inspection of the vendor.

9.7 Receiving Inspection

9.7.1 Initial Receiving

All incoming parts or materials will be inspected by the receiver and the confirmation of the parts ordered will be established by cross referencing the part numbers on the purchase order, packing slip and the part numbers on the items received. Items received will be acknowledged as received by placing the verification and received stamp on either the PO **(SV19 12.0)** and vendors packing slip **(SV19.13.0)** and signing where required.

9.7.2 Service Inspection

When PSV components are ordered for specific valves during the service process the parts are to go to the service department and a copy of the packing slip is to be attached

to the service job. Verification of the part(s) to OEM requirements and specifications will be confirmed by the senior service technician in the inspection room process. This process includes a review of the receiving documents. The Packing Slip and other verification documents will be attached to the applicable Kings Business Manager Job and a copy is kept in the jobs hard file. In the event, inventoried components are being added to a PSV during the service process a senior technician will verify the part(s) to OEM requirements and specifications before installation.

9.8 Packaging, Shipping and Transport

Proper packaging and transportation of PRD's is imperative to the accuracy of pretests and the reliability of set pressure after servicing. Kings Energy services policy is to always ship PRD's in the upright position whenever possible. See procedure **QW 12.1** (Packaging, Shipping and Transportation of Pressure relief Devices) and **QW 12.1** (Shipping of threaded Serviced) PSV's).

9.9 Storage of Components

A system of racks, shelves and bins will be marked with part numbers. All parts which are stored in the inventory system will have the part numbers clearly marked on them. If the original packaging does not have adequate marking the parts will be labeled with the part number using an Inventory tag **(SV19 15.0**) and stored in the appropriate locations.

9.9.1 Parts Tag **(SV19. 15.0)**

The tagging for PSV parts will consist of as a minimum of the following information;

- Part Number
- Order PO# or Job#
- When applicable, the conversion job which the parts originally came from

9.10 Packing Slips/Invoices

All packing slips and invoices will be correlated with the purchase order and parts received and handled according to good accounting practices.

9.11 Stock Room

Those items which are stored either on shelves, pallets, or in crates will have the part number marked either below the part, on the part, or on a tag attached to the shelf, pallet, or crate. This constitutes the Stockroom.

9.12 Spring Control

Control of safety relief valve springs is critical in maintaining proper repairs, lift, and capacities in safety relief valves. Upon ordering springs for a specific service outside of replenishing inventory, those ordering will supply the manufacture/vendor with the pertinent information, e.g.; valve type, size, model number, set pressure, service temperature, gas conditions such as corrosive or sweet.

When received, the purchaser will verify spring number(s) to the order number from the manufacturer/vendor. If incorrect, the Department Manager-Valve Servicing/Team Lead PSV will be notified and a non-conformance report filed. When size permits will have the spring number stamped on the last coil. When springs are too small to permit stamping, the springs will be tagged showing the designated part number. After tagging, the spring or springs will be put with the valve(s) it was ordered for, and part number/spring number recorded on QF9.50 PSV Traveler and Data Sheet. If the spring or springs are ordered for inventory they will be tagged with the part number and stored in the proper location.

9.13 Control of Aluminized or Colour Coded Springs

The Aluminization of PSV springs is under the strict guidance of OEM procedures. For springs which require protective aluminized coating for corrosive service, or which are colour coded, all effort will be made to order springs from the manufacturer/vendor stating all pertinent information, e.g.; model number, size set pressure, service temperature and product being controlled. Upon receipt of spring or springs, A qualified PSV technician will verify spring numbers to vendors order numbers and verify spring tag numbers to order numbers. All identifying spring tags which are affixed to the spring will remain on that spring until time of assembly.

Any spring sent out for Aluminization as part of its service will be under the guidance of documented OEM procedures.

Annex E

Technical Standards and Safety Authority Addendum

SV10 Repair and Inspection Program

10.0 Scope

To define the processes in place for the setting and servicing of relief valves, safety valves and safety relief valves at Kings Energy Services Ltd.

10.1 Electronic VeeBase Traveler

All ASME Section I, XII & Non Code PRD's received will be inspected and the "as received" condition documented in the receiving task of VeeBase. Name information will be inserted in the VeeBase traveler data base along with all other relevant customer information. The QF9.50 PSV Traveler and Data Sheet will accompany the valve throughout the repair.

10.2 Authorization Form- (QF10.5)

All set pressure changes, valve replacements with an adjustment or any other changes or conversions will be authorized in writing by the customer on a QF10.5 Reset/Replace Authorization Form **(SV19.20**). This form can be either supplied by the customer or the QF10.5 Reset/Replace authorization form. The completed Form will be attached to the service report and stored with the customer files. **No valve which has had a set pressure change or any other changes noted in this section will be released from any Kings service facility without a signed form.**

10.3 Handling Valves in the Kings Facility

PSV's are delicate and precisely engineered pieces of equipment. Their care and handling is imperative to ensure proper pretest results and to reduce the damage to critical internal components. Reduced excessive "Rough Handling" will diminish the risk of damage to the internal components and prevent leaking issues when the repaired valve is returned to service. Whenever safe and practical to do so, all PSV's will be received and returned to their service in the upright position. During the service process at Kings Energy Services, valves are to remain in an upright position when practical and every effort must be made to avoid "Rough Handling" until the results of the pretest have been recorded. Serviced valves, when practical, are to remain upright from the time of reassembly up to and including shipping.

If a valve arrives on its side it will be documented and placed upright, if practical, to reduce additional concerns.

When in a Kings Energy Services repair facility, it is expected that excessive rough handling will be avoided and that all flanged valves will be upright and all effort will be made to move threaded valves about the shop in the same fashion. If it is impractical or unsafe to do so, additional care in handling in accordance to API-576 recommended practices will be required and that effort is to be documented in the Electronic VeeBase job.

10.4 Maintenance Manual

The Valve Technician will verify that there is a manufacture's repair procedure applicable to the device being serviced. If there is not a repair procedure the Department Manager/Team Lead-PSV will obtain a Manufactures Maintenance Manual to determine the procedures and specifications to be used. In the event that a Manufactures maintenance manual is not available "best industry practices" shall apply.

10.5 Pretest

All valves received for service at Kings Energy Service Ltd. will be pretested as per customer requirements if safe to do so. The results are to be documented in the VeeBase service program before the valve is dismantled. This information is critical for the owners' assessment of service intervals. Kings Energy Services requires, at a minimum, two (2) pretests to provide an accurate assessment of the valve(s) operating status during the pretest.

10.5.1 Waiving the Pretest

Whenever a customer, for whatever reason, requests to waive a pretest, the QF 10.4 Pretest Waiver Form **(SV19 23.0)** must be filled out in its entirety and acknowledged by the appropriate authority within the valve owners' organization. The waiver will be attached to the corresponding Tracker job for future reference. If applicable, a copy will also accompany the Data Sheet when it is provided to the customer.

10.6 Repair Assessment

The Department Manager/Team Lead-PSV shall assign a PRD Technician to evaluate the feasibility of repair. The Technician will disassemble, clean and inspect each component of the valve in accordance with the applicable repair procedure. Disassembled valves will be controlled in their own parts boxes or trays throughout their time during the service/repair process.

10.7 Critical Dimensions

The device shall have critical dimensions checked as per manufacturer's instructions and be repaired and assembled in accordance with the manufacturer's procedures and instructions applicable to the device being repaired. Springs and all other parts will be verified in accordance with manufacturer's standards. Parts outside of manufacturers' tolerances maybe machined to acceptable limits or otherwise must be replaced with new components. These dimensions are to be recorded in Kings VeeBase and are part of the **(SV19 1.0)** Inspection and Test report.

10.8 Testing

Valves will be tested to the manufacture's specification and the appropriate NB, ASME and the TSSA Safety Standards Act. If the valve being serviced is outside of the locations scope and the test equipment is not capable of accurately testing the PRD to the valves set pressure definition, it shall not be tested. Confirmation of sufficient lift is required as part of the setting procedure.

10.8.1 Test only

The valve(s) will be tested to the prescribed set pressure definition and a seat tightness test will be performed. (See SV13 of this addendum)

- A VeeBase service report as per 10.12 of this section will be provided
- Valves will be sealed to section 10.13 of this addendum.

10.8.2 Blowdown Settings

Blow down settings will be in accordance to manufactures specifications and procedures.

10.8.3 Cold Differential Set Pressure

The Cold differential set pressure will be performed in accordance with the valve manufacturer's recommendations

10.8.4 Final Testing

After servicing and setting the PRV a final test will be conducted to confirm the valve is functioning within ASME code and OEM design. A seat tightness test will also be performed to determine if any leakage is present (see section SV13) of this addendum.

10.8.5 Seat Tightness

After servicing PRV's a seat tightness test is required in accordance to the manufacturer or applicable ASME codes.

Technicians must possess a fundamental understanding of API-527 and demonstrate competency **(SV17)** before conducting any testing tasks. For Air/Gas, Steam or closed bonnet Valves on liquid service seat tightness criteria will meet Manufacturer's specification or API standard 527 for flanged and threaded relief valves, safety valves and safety relief valves as applicable. The Test data shall be recorded in the service details.

10.9 Tagging

After a PRD has been serviced it will be tagged to the requirements of the TSSA and section SV14 of this Addendum.

10.10 Tags for Set pressure Change

If the set pressure is changed, the previous set pressure, capacity, and blow down, on the original nameplate or stamping shall be crossed out but left legible. The new set pressure and capacity will be stamped on a "Repaired By" nameplate **(SV19 2.0)** which is to be fixed securely.

10.11 Duplicate Data Nameplate

If a PRV is received with a missing or illegible OEM nameplate and can be verified, a "Duplicate Data" nameplate **(SV19 3.0)** will be securely attached. The new nameplate will contain all original information excluding the ASME code and NB stamps. The date of the tag installation as well as the ASVS and CRN numbers will be added. If a valve cannot be positively verified Kings Energy Services is not authorized to service it.

10.11.1 Receiving of Valves with Illegible or Missing Nameplates

When valves arrive at a Kings service facility with either illegible or missing nameplates the observed issue is to be documented in VeeBase, following NBIC Part 4 for illegible or missing nameplates at the receiving stage. This documentation will also include verbal communication of the observation with a senior technician.

10.12 Inspection and Test Reports (Data Reports)

An Inspection and Test Report **(SV19 1.0)** is required following the completion of a PRD's service. The inspection and test report will be available on-line accessible through the Kings Energy Services website once the final inspection has been completed. Reports may also accompany the valve or be provided to the owners integrity department electronically. These records are crucial to the owners and great care is required to ensure their accuracy. Service reports shall include;

- PRD identification.
- ASME Code symbol.
- Original nameplate information.
- Scope of work.
- As received condition.
- Pre-test results.
- Parts either repaired or replaced.
- Critical part measurements
- Set pressure test results.
- Seat tightness test results.

10.13 Sealing

Once a PRD has been serviced and set pressure has been achieved, all points of adjustment will be sealed. This shall be done with the registered seals outlined in section SV3 of this addendum.

10.14 Conversions and Changes

In the event a conversion or change to the PRV is required it will be handled in accordance to the manufacturers requirements. All changes will be noted on the veebase data sheet with a copy going to the valve owners. A conversion or change includes;

- A change of set pressure.
- Change of fluid service.
- Installation or removal of bellows.
- A Change of either hard or soft seats.
- Or any other changes which may affect the type/model number.

Whenever a conversion or change has been made to a valve a metal "Repaired By" nameplate as per section SV14 of this manual shall be installed.

10.14.1 Requesting Different Units of Measurement

At times a valve owner will request different units of measurements on their service sheets than what is represented on the OEM nameplate. (Example; nameplate is in PSI and the customer wants the data in KPA). Data plate information and service sheet data must read the same. To accomplish this technicians are to attach a Duplicate Data Nameplate firmly to valve with the new units of measurement for both set pressure and capacity.

10.15 Non-Code Valves

Pressure relief valves that are not stamped with ASME code symbol may be serviced, set, tagged and sealed at the adjustment points. The owner will be notified that the valve may not be acceptable for service in their pressure systems under the jurisdiction of the Technical Safety Standards Act. The Polythermal Service By/Repaired By/Test Only tag will be stamped with the words "Non-Code".

10.16 Shipping

Proper shipping techniques of PRD's are imperative for making adequate pretest observations and to insure the valves ability to function when returned to service. Kings policy is, whenever possible, to ship all PRD's in the upright position. Flanged valves will be placed on a pallet while threaded valves will be boxed upright and packed securely. Valves and boxes will be marked as "This Side Up" **(SV19 7.0)** and include the Carrier Caution shipping sticker (**SV19 8.0)**

10.17 Assist Lift Device

The purpose of this section is to outline the requirements for the testing and setting of PRD's using an assist lift device (ALD) at Kings Energy Services Ltd. shop or field locations. Test in the field in this Addendum means "insitu" only and not to verify set pressure after repair

10.18 Assist Lift Testing

An assist lift device is used to apply an auxiliary lifting force on the spring of a PRD to establish set pressure in lieu of the normal bench test method when the full test pressure is not achievable on the test bench or the system the valve is being tested on. The use of an assist lift device is also justified when:

- It is necessary to avoid damage to the PRD seat sealing surfaces

- Full lift is impractical due to system design considerations that preclude testing at full pressure
- Full lift may cause undesired upsets within the process system
- A PRD is welded in-line and requires in-line servicing and setting

Note: The maximum set pressure will not exceed the ALD manufacturers recommended procedures.

10.19 Organizational Requirements

The operational manual and procedures will be stored with the equipment and within easy access to the operator

- Only trained personal deemed as competent will operate the equipment
- The Equipment will be operated to KES (QW9.4) procedure and the manufacturers procedures
- All components will be visually inspected prior to use. This is regardless of any previous operational or safety concerns
- Up to date and current software is a requirement for the proper and safe operation of Assist lift Devices. Software updates are to follow OEM recommendations and practices.

10.20 Calibration

The calibration of the assist lift equipment is paramount to its accuracy for valve setting and testing. Calibration of key components will be a minimum of every 12 months as per OEM recommendations.

10.20.1 Key Components Include

- The Force Transducer
- Lift Transducer
- Pressure Transmitter

10.20.2 OEM Certification

The Team Lead - PSV is responsible for the regular review of the equipment. It is recommended that all critical components of the assist lift device be sent to the OEM every two (2) years for factory upgrade, checkup, and calibration as per OEM recommendations.

All calibration, OEM Procedure and applicable documents are to be kept in the Ventil operation folder which is kept with the applicable Ventil Assist Lift Device which is identified by its serial number.

10.21 Field Testing

In line testing and verification of PRD's is sometimes required. Kings field testing personnel are to be adequately trained and this training shall be documented (**SV17)**. Field testing will follow the guidelines set out in the Ventil PreVenTest Force Chart. Valves which have had set pressure verified or reset in the field will be identified with a Test Only Tag.

10.22 ALD Valve Servicing Technician Requirements

When Testing and servicing valves insitu, as a minimum, technicians shall

Be a graduate of at least one manufacturers course

- Have documented in house ALD or Preventest training
- Training is to cover the fundamentals of using the machine and the characteristics of steam valves under pressure
- Two years of valve serving experience with Section I and Section VIII steam valves
- Complete testing and setting of PSV's with the use of ALD twice a year to maintain their certification

Technicians are expected to be proficiently trained on the operation and safety of the reseating equipment. The Reseating Machine is designed to mount directly on the body of the PRV and rework nozzles (bushings) back to manufactures specifications. Outside diameter, inside diameter and faces of the nozzles can be machined to manufacturers tolerances the reseating equipment while the valve is in-line. Discs and nozzles will be lapped by hand. The valve will then be re-assembled and tested.

- Training and documentation of training
- Ensuring software is up to date
- Ensuring OEM service, maintenance and calibration are completed within OEM requirements
- Maintaining service and maintenance logs

10.23 ALD Servicing Manager is Responsible For But Not Limited to;

- Overseeing training of all ALD Service Technicians which includes training technicians on the use of equipment, safety concerns and operational requirements to work on a customer's site
- All aspects of in-line service work
- Communicating with Branch Managers, Technicians and owners when required
- Confirming calibration and training requirements are met before external work begins

10.24 ALD Valve Service Technician is Responsible For But Not Limited to;

- Assuring the ALD is within the calibration requirements of the manufacturer before use
- The safe storage and use of the equipment
- Maintaining proper training and certification and deemed competent on the tasks to be performed
- Operating the equipment within the parameters of OEM procedures
- Servicing and maintenance of equipment
- Recording the test and lift data on the valve data sheet
- Required PPE
- Technical preparation and understanding of the valves to be serviced
- Care and handling of calibrated equipment in their possession
- Adhering to the safety requirements of Kings Energy Services Ltd. and the owners work site
- Following the guidelines as defined in the quality and safety management systems

10.25 Organizational Requirements

- The operational manual and procedures will be stored with the equipment and within easy access to the operator. It is up to the operator to confirm these documents are up to date prior to the equipment's use.
- Only trained personal deemed as competent will operate the equipment
- The Equipment will be operated to QW9.24 ALD Instruction procedure in conjunction with the manufacturers procedures
- All components will be visually inspected prior to use. This is regardless of any previous operational or safety concerns or previous inspections.

10.26 Software

Up to date and current software is a requirement for the proper and safe operation of Assist lift Devices. Software updates are to follow OEM recommendations and practices.

10.27 Calibration

The calibration of the assist lift equipment is paramount to its accuracy for valve setting and testing. Calibration of key components will be a minimum of every 12 months as per OEM recommendations.

10.27.1 Key Components Include

- The Force Transducer
- Lift Transducer
- Pressure Transmitter

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11.0 Scope

The purpose of this section is to outline and control special processes required in the repair of PRD's in conjunction with NB-23, jurisdictional code and regulations and OEM requirements.

11.1 Responsibilities

11.1.1 Division Managers/Branch Managers/Team Lead-PSV are responsible for but limited to

- Confirming and documenting competency of workers performing specialized tasks
- Ensuring critical dimensions are recorded before and after machining

11.2 Machining

At times the machining of PRD components may be required to bring said components back to OEM tolerance. In these circumstances this task will be performed or witnessed by a technician trained as competent in the machining process. Critical dimensional measurements will be taken And documented before and after the machining process and included on the traveler document and be part of the inspection test report. Critical dimension specifications will be controlled with a log to identify the history of the document and shall be reviewed no less the annually.

11.3 Welding and Heat Treatment

Welding and heat treatment shall not be performed or permitted.

11.4 Responsibility's

Division Manager East is responsible for:

- The Supervision of Field Repairs
- Visual verification of PRD Travellers and Field Repair Records
- All functions affecting the quality of the repaired valves to be supervised from the address of record on the issued certificate

Field Service Manager (On-Site Unit)/ Division Manager East is responsible for:

- Issuing Repair Documentation
- OEM Manuals and Instructions
- PRD Traveller
- Applicable ASME Code (PRV repair)
- Kings Energy Services written procedures and instructions
- Ensuring that the latest revision of the Quality Manual is available

- Auxiliary Lift Device written procedures and instructions
- Pressure gauges and calibration records

Quality Manager is responsible for:

- Performing and documenting Field Audits which shall include but not limited to performance testing in accordance with NBIC

11.5 Field Servicing and Testing of PRD,s

The procedure for testing and repair of PRD,s in the field using Kings Energy Services Field Mobile relief test stand are as per SV13 Test Stand Procedure of this addendum.

The procedure for testing and servicing PRD,s in the field shall be as per SV10 of this addendum

All sections of this manual apply to Kings On-Site-Unit

All functions affecting the quality of the field and on site unit repaired valves is to be supervised by the Division Manger East.

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SV12 Testing Equipment and Testing Procedure

12.0 Scope

To provide and maintain PRD performance test equipment to the standards of National Board, ASME, and the Technical Standards and Safety Authority Standards Act. Any adjustment s or alterations to Kings pressure equipment must be approved by the Division Manager-East.

12.1 Responsibilities

12.1.1 Division Managers are responsible for;

- Ensuring the maintenance and up keep of the pressure equipment within their branch is being performed
- Maintaining up to date pressure equipment records as per NB-23 part 1 and 2 and CSA-51 including service and inspections
- Confirming any alterations of pressure equipment is under the supervision of the Director Operational Services and follows jurisdictional guidelines
- Ensure that any alterations or repairs comply with jurisdictional and code requirements and have them inspected by a TSSA Inspector. Re-registration with TSSA is also required for any modifications.
- Ensuring only trained personnel use or maintain pressure equipment

12.1.2 Department Manger-PSV Team Lead-PSV are responsible for;

- Day to day maintenance of pressure equipment
- Documentation of service records
- Operational procedures
- Assisting Division Manager with maintaining up to date pressure equipment records as per NB-23 part 1 and 2 and CSA-B51 including service and inspections
- Informing the Division Manager when observations of concern arise
- Training personnel on the cautions and proper use of pressure equipment
- Ensuring only trained personnel use or maintain pressure equipment

12.1.3 Division Manager-East is responsible for;

- Confirming Department Managers-Valve Servicing /Team Lead-PSV responsibilities are being followed
- Ensure that any alterations or repairs comply with jurisdictional and code requirements and have them inspected by a TSSA Inspector. Re-registration with TSSA is also required for any alterations.
- Assisting Department Managers/Team Lead-PSV in the maintenance of pressure equipment files

12.2 Test Equipment

All Kings Energy Services testing equipment shall include a pressure vessel of adequate size, volume and capacity to cause the disc to significantly (pop open) and re-close

The equipment used for performance testing shall be certified and meet the requirements of NBIC Part 4, Section 4.6.1

12.3 Qualification of Test Equipment

Kings Energy Services will qualify all performance testing equipment prior to use, to ensure the equipment and testing procedures will provide accurate results when used within the ranges established for that equipment.

This qualification may be accomplished by benchmark testing, comparisons to equipment used for verification testing or comparisons to field performance

This qualification shall be documented, and retained for a period of at least 5 years after the testing equipment is retired.

Documentation of this qualification shall include, but not limited to:

- Schematic of the performance test equipment
- Size and pressure ranges of valves to be tested
- Dimensions of test vessels
- Accuracy of pressure measuring equipment
- Size and design type of valves used to control flow
- Method of qualifying

12.4 Addition or Modification of Test Equipment

Kings Energy Services shall prior to the implementation of addition or modification to the test equipment which would alter the contents of the document required in NBIC Part 4, Section 4.61(b)(2) re-qualify the performance test equipment.
If the equipment changed was used to satisfy the requirements of verification testing Kings Energy Services shall notify TSSA and additional verification testing may be required.

12.5 Pretest

As per KES policy, Pretesting PRV's is mandatory at Kings Energy Services. A minimum of two tests will be performed and documented in order to capture the "as is" condition of the valve and how it would have reacted while in service. In the event the owner insists they do not want Kings Energy Services to perform a pretest, refer to section 10.5.1 (Waiving the Pretest) of this addendum.

12.6 Air test Stand

All air testing of pressure relief valves shall be performed by qualified valve technicians or under the proper supervision of a higher level technician signed off as a trainer. Testing will be in

accordance to procedures and the scope of work as stated in the Kings Energy Services Quality Control Manual, as well as manufacturer's specifications and applicable codes. Set pressure definitions will be as per manufacturer or NB-13.

12.7 Liquid / Air Test Bench

All liquid testing of pressure relief valves shall be performed by qualified valve technicians or under the proper supervision of a higher level technician signed off as a trainer. Testing will be in accordance with procedures and the scope of work as stated in the Kings Energy Services Quality Control Manual, as well as manufacturer's specifications and applicable codes. Set pressure definitions will be as per manufacturer or NB-13.

12.8 Steam Testing

Kings policy deems all code PRV's used in steam service will be tested by qualified valve technician or under the supervision of a qualified trainer, as per TSSA requirements.

12.9 ASME Section VIII Valves

When ASME Section VIII valves are repaired by Kings Energy Services for Kings Energy Services use, valves for steam service may be tested on air for set pressure, and when possible, blowdown adjustment , provided the manufacturer's corrections for differential in set pressure between steam and air are applied to the set pressure, as per NBIC Part4 Section 4.6.2

12.10 Test Only

There may be times when a customer has a request for a valve to be "Test Only". In this circumstance the customer is looking for pretest information without servicing the valve). A minimum of two tests is required as per 13.4 of this addendum. The first test will be recorded in the pretest section of the service report and the second test will go into the report as the final test. In the event that three tests may be required to fully assess the valves operation, the first two will be recorded in the pretest section of VeeBase and the third test will be recorded in the final comments section. (see section 13.4.1 of this addendum). An authorization form must be filled out and signed by the owner to complete this task.

12.11 Back Pressure

Back Pressure testing is an OEM expectation with the exception of certain exemptions. These exemptions include open bonnet and open lift lever valves, tank vents, or any other circumstance in which a back pressure test may harm the valve such as certain bellows applications or when valves are not designed to allow outlet piping.

When back pressure is noted at the valve outlet and in the downstream portion of the valve body, adjustment of the spring setting will be made to compensate for constant and superimposed back pressure, except for "balanced valves". The compensated back pressure value is added to the service tag. For variable back pressure, no compensation is made.

When making back pressure compensation adjustments, outside of the exemptions noted above, the valve(s) will be tested to the maximum known back pressure values whether constant, variable or superimposed.

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SV13 Test Stand Procedure

13.0 Scope

To provide guidance and directions on the proper use of and procedures of PSV test stands with in the KES organization. All pressure vessels and when required Piping must be registered with TSSA

13.1 Set Point Definition

Relief valves can have various definitions of set pressure. When the designated valve tester is verifying the setting of a relief valve, they must take into account the manufacturer's definition of set pressure for each style of valve being tested. If the tester does not adhere to this it can have a significant effect on the accuracy of the setting. Some examples of set point definition include;

1. Initial steady stream
2. Heavy flow
3. Start to Leak
4. Initial audible discharge
5. Pop

It is by Industry definitions that the tester will set all relief valves. When the tester is uncertain of the required definition of set pressure they will refer to N.B. 13

13.2 Preparation for Testing

The designated tester shall ensure that the valve is not damaged from a dirty test stand. To do this, before pretest or final set the valve is mounted to the test stand, the tester will open the air supply and allow the air pressure to freely flow through the stand. Caution must be exercised when performing this action to prevent injury or damage from debris. With a clean cloth wipe the inlet flange and nozzle bore of the valve to be tested.

13.3 Nozzle Ring

Nozzle ring adjustment may at times be specific to a particular service condition. In lieu of customer requirements follow OEM procedures for recommended settings.

13.4 Testing without Servicing (Test Only)

At times, customers may request a set pressure be verified without servicing the valve. In this case the inlet and outlet are to be free of any dangerous debris and dry. The valve will be mounted on the appropriate test stand and relieved a minimum of twice as per Kings pretest policy. The valve will meet the manufacturer's specification and appropriate codes and be

sealed with a metal “Test Only” nameplate **(SV19 4.0)** before being returned to service or customer inventory.

13.4.1 Recording Test Only Data

The first pop of a test only valve will be considered as the as received condition. This test determines how the valve would of reacted if required during its time in service. The information shall be recorded in the pretest segment of VeeBase. The second pop will be considered as the final pretest test and the information will also be recorded in the pretest portion of VeeBase. In the event that a third test is required to properly understand the valves performance it will also be added to the pretest section with additional observations added in the comments section of the Inspection and Test Report.

13.5 Pretesting

It is both an industry requirement and Kings Energy Services policy that all PRD’s received for service at any Kings facility will be pretested. The only exceptions are when the received valve condition will pose a hazard if pretested or if the customer has Kings senior management approval and completes the requirements of the QF10.4 Pretest Waiver Form **(SV19 23.0)** , or provides documentation on the owners letterhead supporting the exemption. A minimum of 2 pretests is required to adequately assess the valves operation.

13.5.1 Customer Requirements

Before any pre-test is started, when applicable, the specific customer requirements for pre-testing shall be reviewed to ensure their pretest requirements are met. Customer requirements are attached in KBM.

13 .5.2 Pretest Inspection

All valves to be pre-tested will be inspected visually to ensure the valve is safe to place on the test stand. Some issues to observe before the pretest include valve body integrity, leakage, ensuring all the parts are bolted and tight and seals are in place. As well the inlet and outlet ports of the valve will be inspected to confirm they are open and free of loose debris. . Any observations will be noted on the pretest report in the VeeBase data program.

13 .6 Testing of the Valve

The Valve is to be mounted on the test stand that is rated for the service of the valve being tested. Unless specified by the owner, the tester will slowly increase the test medium until the valve lifts or to a maximum of 150% of set pressure while staying within the limits required by codes, standards, regulations, maximum pressure rating of the valve, and the configuration of the test stand. The tester will record the results of the pre-test on the traveler and enter it in the data base in the pre-test section of VeeBase. Additional observations will be noted in the comments section.

Kings Energy services technicians are responsible for recording valve data as found. They are not responsible for the determination of "Pass or Fail" unless the pass/fail criteria unless it is clearly outlined and documented by the owner

13.6.1 Steam Valves

All valves in steam service under the TSSA's jurisdiction must be verified on steam.

13.7 Scope

The scope of this section is to provide technicians with guidance for the tightness testing and valve leakage assessment.

13.8 Back Pressure Testing of Safety Valves

The purpose of Back Pressure Testing a safety relief valve is to check for leaks in the secondary pressure zone (external pressure sources from the outlet side applied to the Pressure Envelope). The back pressure test is performed after the valve has been assembled and set to the correct pressure. This process is under the guidance of OEM requirements or the applicable ASME code section. It is recommended the back pressure test be performed before the leakage testing. This will ensure there is no pressure migration that may affect the API 527 leakage testing.

If any part of the valve is producing bubbles outside OEM specifications the valve(s) is disassembled, repaired, reassembled and tested. If no leaks are detected the test shall be considered a pass and valve will proceed through the service process.

Back pressure testing of PRD's is required with the exception of the exemptions outlined in section 12.6 of this addendum.

13.9 Bellows Leak Testing

Bellows leakage is determined by a pressure test. Bellows are generally constructed out of Stainless Steel or Inconel materials which are required to have flexibility resulting in a delicate assembly which requires careful handling. Cleaning should be limited to solvent methods. Outside of any perforations or cracks, a bellows limited life expectancy can also be noted by any pitting or surface corrosion.

A visual inspection of the gasket joint and overall construction will be made. Gasket leaks will be rectified by installing a new gasket, coil leaks or seam leaks will be rectified by replacement of the bellows. No welding or brazing will be performed on any part of the bellow assembly.

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SV14 Nameplates

14.0 Scope

PRV's are tagged in accordance to NBIC Part 4 Section 4.7.1. Nameplates and Tags shall be of a material deemed sufficiently durable and suited for the intended service.

Upon completion of all testing of a pressure relief device (PRD), a service, repair, or duplicate nameplate or tag will be attached. Proper marking and identification of tested or repaired valves is critical to ensure its acceptance during inspections, provides traceability and notes changes made to the valve.

It is the responsibility of the Division Manager for the verification of nameplate data and recording the verification on the Veebase PSV Traveller

14.1 Marking of Nameplates

Nameplates are to be of an approved material and marking may be produced by one or more of the following methods.

- Casting
- Stamping
- Etching
- Printing
- Embossing/debossing
- Engraving

14.2 PSV Tag Requirements

When servicing a relief valve, as per the definition in this manual, a metal "Serviced By" nameplate **(SV19 5.0)**

14.2.1 Tag Requirements

As a minimum, the information on the valve service tag will include:

- The name of the service organization (Kings Energy Services) proceeded by the words "Serviced by".
- Date of repair
- Model number
- TSSA QA Number
- When an adjustment is made to correct for service conditions, of superimposed back pressure and/or temperature or the differential between popping pressure between steam and air, the information to be added to the nameplate will include;

1. Cold Differential Test Pressure (CDTP)
2. Superimposed Back Pressure (BP) (only when applicable)

14.2.2 Non-Code Applications

When Non-Code valves are serviced or repaired at a Kings facility adjusting points will be sealed with non-code sealing pliers.

14.2.3 Tagging for Serviced Steam Valves

When a PRD is on steam service a "Serviced By" nameplate **(SV19 5.0)** with the required information as per this addendum will be used.

14.3 Repair Nameplate

When a repair has been made a metal "Repaired By Nameplate" **(SV19 3.0)** will be used and securely attached to the valve adjacent to the original name plate. In the event there is not space on the valve to securely attach the nameplate (Riveted whenever possible) it shall be securely attached as so it will not interfere with the valves operation. Any alterations made to the valve which will change any of the OEM information on the manufacturers' nameplate requires a repair nameplate. In addition to the metal "Repaired By" nameplate, **(SV19 2.0) .** The minimum information as per NBIC Part 4 required on the repair nameplate is as follows.

- The name of the repair organization (Kings Energy Services) proceeded by the words "Repaired by".
- Date of repair
- CRN Number (if not on the original plate)
- Set pressure (if changed)
- Capacity and capacity units (if changed from original nameplate due to set pressure and/or service fluid change).
- Type or model if changed
- When an adjustment is made to correct for service conditions of superimposed back pressure and/or temperature or the differential between popping pressure between steam and air the information on the valve repair nameplate shall include the:
    1. Cold Differential Test Pressure and,
    2. Superimposed Back Pressure (only when applicable)

Old information on the OEM plate will be crossed out but left legible (See section 17.5).

14.3.1 Non-Code Applications

When Non-Code valves are serviced or repaired at a Kings facility, they will be sealed with non-code sealing pliers and the words NON-CODE will be clearly stamped or etched into the code section of the nameplate. In the event of limited space on the nameplate "N\C" maybe used as a substitute.

14.4 Changes to Original Nameplate Information

14.4.1 Set pressure

If the set pressure is changed, the original set pressure, capacity, and blowdown, if applicable, is to be crossed out, but left legible. The new set pressure, capacity, and blowdown, if applicable, will be stamped on a “Repaired by” nameplate **(SV19 2.0)** and secured above or adjacent to the original nameplate

14.4.2 Service Fluid

If the service fluid is changed it shall be considered a conversion of the valves original configuration. The old capacity, including units, on the original nameplate or stamping will be crossed out, but left legible and the new information will be stamped on a “Repaired by” nameplate **(SV19 2.0)** . The new nameplate shall be firmly attached to the valve.

14.4.3 Model/Type

If the model/type number is changed, the model/type number on the original nameplate will be crossed out but left legible and the new information will be stamped on a “Repaired by” nameplate **(SV19 2.0)** .

14.4.4 Capacity

If capacity is changed, the data on the original nameplate or stamping will be crossed out, but left legible. The new capacity will be based on current ASME Code requirements and the new information will be stamped on a “Repaired by” nameplate” **(SV19 2.0)** .

14.5 Duplicate Data Nameplates

14.5.1 Missing Nameplates

If the OEM nameplate is missing and the valve information is traceable and can be confirmed by the OEM a “Duplicate Data” nameplate **(SV19 3.0)**will be securely attached to a valve. The nameplate will contain all original information except for the ASME code and NB stamps. The duplicate Nameplate will also include

- The name of the service company (Kings Energy Services)
- The date the duplicate tag was installed
- CRN number
- ASME Sec I, ASME Sec IV or ASME Sec VIII as applicable

14.5.1.1 Missing Nameplates Verification

When an original nameplate is missing, repairs are not authorized unless positive identification can be made to that specific valve and verification that it was originally marked with an ASME code symbol (V, UV, or HV). If the valve and its components can be positively identified, a Duplicate Data nameplate and the applicable “Repaired By” **(SV19 2.0)** or “Serviced By” nameplate **(SV19 5.0)** is

attached. If the information is not able to be verified consult section 17.5.5 of this addendum.

14.5.2 Illegible Nameplates

When information on the original manufacturers or assemblers nameplate or stamping is illegible, but traceability can be confirmed, the nameplate or stamping will be augmented by a duplicate data tag. The "Duplicate Data" nameplate **(SV19 3.0)** will contain all the information on the original nameplate excluding the ASME code and NB stamps.

14.5.3 Marking of Original Code Stamp

When a duplicate name plate is attached to the valve it will be marked with "Sec I", "Sec IV", or "Sec VIII" as applicable to indicate original code stamping.

14.5.4 Incorrect information

Any Incorrect information on the original nameplate will be crossed out, but left legible. Correct information will be added to the "Duplicate Data" nameplate **(SV19 4.0)** and noted in VeeBase if applicable.

14.5.5 Non Traceable OEM Information

Kings Energy Services Ltd. personnel are not authorized to service a valve in the event an OEM nameplate information is illegible or not traceable. No duplicate nameplate shall be installed if a valve cannot be verified and confirmed by the OEM.

14.6 Test Only Tag

When a valve is tested and if required adjusted but not otherwise serviced or repaired, a metal "Test Only" tag" **(SV19 4.0)** will be attached to the valve. The following information, as a minimum, shall be included on the tag:

- Name of testing organization preceded by the words "Tested By"
- Date of test
- Set pressure
- Identification as "Test Only"

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SV15 Measuring Tool Calibration

15.0 Scope

This section provides an outline of proper procedures when dealing with measuring equipment and its calibration. Critical part(s) verification as per OEM standards will be done by measuring tools which have been calibrated or compared to a calibrated test block known to have a valid relationship with nationally recognized standards.

15.1 Responsibilities

15.1.1 Division/Branch Manager is responsible for but not limited to

- Ensuring the QF7.4 Measuring Tool Inspection and Calibration Records are up to date as required
- Replacing any measuring equipment which is out of adjustment and cannot be calibrated
- Monitor the safe storage and handling of measuring equipment

15.1.2 Team Lead-PSV is responsible for but not limited to

- Inspecting and calibrating required measuring equipment within their service intervals
- Recording inspection and calibration observations in the Measuring Equipment Log
- Ensuring the QF7.4 Measuring Tool Inspection and Calibration Records **(SV19 9.0)** are up to date as required
- Monitor the safe storage and handling of measuring equipment
- Provide safeguards to prevent unauthorized adjustments or tampering

15.2 Measuring Tool Identification

All measuring tools used for critical dimensional verification shall have a tool I.D. number. This I.D. number is to be visible on the device, (etched whenever possible). The unique ID number shall be recorded in the measuring equipment log book which contains calibration readings and all other pertinent information for each certified tool.

15.3 Measuring Tool Log

The Measuring Tool Log must be completed following the calibration process. The log will contain not less than the following for each tool.

- Tool I.D
- Manufacturer
- Serial Number of Tool (if available)

- Certifying measurements

15.4 Calibration Intervals

Measuring tools will be checked for calibration a minimum of every six (6) months. If discrepancies are found in the readings or performance of the tool, the tool will be immediately checked against the appropriate test gauge/block. At this time, any adjustments can be made to correct those discrepancies. For problems that cannot be solved in-house, the tools will be tagged and sent to a manufactures recommended facility for repair or disposed of as per section 15.10. All actions and comments will be recorded in the measuring tool log book.

When calibrations are performed in-house the certificate shall have the name of the technician that carried out the calibration. Calibration will be carried out as per the relevant procedure.

15.5 Calibration Interval Identification

Each measuring device will be clearly marked with the due date of the next calibration.

15.6 Calibration Range

Calibration conformation of measuring devices will include verification of the full range of the device with a minimum of three (3) measurements.

15.7 Calibration Conditions

The technician performing the verification and/or calibration will ensure the conditions are stable at the time of the test by controlling temperature fluctuations.

15.8 Calibration Discrepancies

The accuracy of critical component measurements of PRD's is essential during the service process. Tool calibrations shall follow OEM guidelines and specifications. When a discrepancy with the measuring tools accuracy is noted the technician and supervisors will assess the impact of the faulty equipment and if deemed necessary notify customers who may have been affected. Measuring equipment deemed inaccurate will be either adjusted as necessary or disposed of as per 15.10 of this manual.

15.9 Tool Storage

All critical measuring equipment must be stored so it is free from harm, abuse, unfavorable environmental conditions and any unauthorized adjustments.

15.10 Tool Disposal

When a measuring tool is found out of calibration and cannot be brought back to exact standards, the tool will be disposed of in such a manner it cannot be retrieved and used again. The tool may also be tagged as reference only and may be used in measuring non-critical parts. Reference only devices are not allowed in areas where critical dimensions are being checked such as the lapping and inspection room. All actions and comments will be recorded in the measuring tool log book.

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SV16 Nonconformance

16.0 Scope

This section defines the processes employed by Kings Energy services in determining and resolving non-conforming matters. .

16.1 Procedure

All non-conformances are to be documented and investigated in a timely manner to establish root cause and to determine what corrective action is required and in what time line. A non-conformance investigation will also evaluate the need for action to prevent similar events from reoccurring.

16.2 Responsibilities

16.2.1 Division Manager-East /Team Lead PSV/Quality Control Inspector are responsible for;

(These responsibilities maybe assigned to one or more individuals)

- Issuing and completing both non-conformance and corrective action reports in a timely manner to eliminate reoccurrence.
- Reporting all non-conformances to the quality control department for filing and follow up
- Root cause Investigation
- Contacting effected parties
- Instituting corrective and preventive actions
- Maintaining the Non-conformance Hold Shelf

16.2.2 QHSE Manager is Responsible for;

- Confirming the information in the non-conformance and corrective action reports
- Contact TSSA (if applicable)
- Approve corrective/preventative actions
- Record Keeping
- Annual review and analysis of all non-conformances and corrective actions.

16.2.3 All Kings Personnel

It is every employee's responsibility to be vigilant and report any and all non-conformances while performing their duties. A non-conformance could be identified through customer complaints, internal audits, external audits, and

incoming material inspections or simply during normal testing and inspection and other day to day activities.

16.3 New Valves and Parts

Upon receipt, all relief valves and/or new parts deemed defective will be identified as a nonconformance which will be subject to rejection. The part and/or valve will be identified with a Nonconformance Hold Tag and placed in a designated hold area. The Division Manager-East/Team Lead PSV is responsible for verifying and the return of all parts to the Supply Chain Department. The Team Lead Purchasing and Inventory Control will work with Quality Control in preparing the product for return to the OEM.

16.4 Converting to Valves to Non-Code

At times the conversion process will alter a code status of a valve from code to non-code. In these circumstances the valve must be identified in the data base as Non-code. The valve seal will be marked “N.C.”, (NON- CODE), on the Sealing button with the company identified sealing pliers. The original code stamping on the OEM plate is to be crossed out and confirmed as illegible. A metal nameplate depicting the repair is then attached. The Metal tag will be stamped with the words “Non-Code” for additional identification, the metal nameplate will be stamped with an N/C.

16.5 Non-conformance

Whenever any break down in the procedures, practices or policies of this organization has affected the quality outcome of the action being undertaken, internally or and has been shipped out of Kings Energy Services control, which is will be described as an Non-Conformance. The Nonconformance and resolution will be documented on an QF13.1 Non-Conformance report **(SV19 10.0)** and followed up with an QF13.1 Corrective Action report **(SV19 11.0)** documenting the root cause and preventive actions.

16.6 Nameplates

For all valves received without nameplates or if the nameplates are not legible, the Division Manager-East/Team Lead PSV will verify the completion of a Non-conformance Hold Tag and place the valve in the Non-conformance hold area. A nonconformance report detailing how the valve irregularity was properly identified will then be submitted to the QHSE Manager who will review the nonconformance and if applicable forward it to the appropriate TSSA Inspector for acceptance. If replacement of a nameplate is necessary, a Duplicate name plate will be installed containing all manufacturers’ data

and the setting of the valve. Should any change be made to the pressure setting from the original factory setting a “Repaired By” tag will also be included.

16.7 Illegal Parts/Repairs

For all valves received with illegal parts, repairs or welding, the Department Manager-East/Team Lead PSV will verify the completion of a Non-conformance Hold Tag and place the valve in the non-conformance hold area. A nonconformance report detailing the non-conformance and the disposition of the valve will be submitted to the QHSE Manager who will review the nonconformance report and if applicable, forward a copy of the report to the appropriate TSSA Inspector for acceptance. All Safety Standards Act code nonconformities will be held until the acceptance has been received.

16.8 Division Manager-East /Team Lead PSV Role

The Division Manager -East/Team Lead PSV will evaluate and sign off all nonconformance reports. They will establish the root cause and requirements for a corrective action and document them on a an QF13.1 Corrective Action report **(SV19 11.0)** . The QHSE Manager will assign a nonconformance number and enter it into the Electronic NCR Matrix. When required, the Division Manager-East/Team Lead PSV will forward a copy of the NC report to an outside customer or vendor for acknowledgement. The QHSE Manager will verify the nonconformance and forward the report to the TSSA when required.

16.9 QHSE Managers Role

The QHSE Manager will review the nonconformance report (Internal or Field) to ensure that a satisfactory resolution has taken place. The QHSE Manager will attach the non-conformance and any corrective action reports to the electronic NCR file along with all associated documents for future reference. The QHSE Manager will review the master NCR log for required action annually. If required the QHSE Manager will forward a copy of the non-conformance report to the TSSA.

16.10 Release of Non-Conforming Parts

To prevent unintended use all non-conforming parts corrected and released from the non-conformance hold area will be verified by the QHSE Manager or Quality Control Inspector before being placed in inventory or used for a sale or service. Any valves or parts which remain non-conforming will be identified and disposed of by immediately removing them to the scrap metal areas after the verification process.

Annex E

Technical Standards and Safety Authority Addendum

SV17 Training

17.0 Scope

This section describes the practices to train, document and evaluate Kings Energy Services employees involved in the setting and servicing of relief valves, safety valves and safety relief valves to a required competency level.

17.1 Responsibilities

17.1.1 Division /Department Manager-Valve Servicing/Team Lead PSV responsibilities are but not restricted to:

- Assessment of employees' training needs
- Maintaining Employee training documentation
- Employee training follow up
- Ongoing development of training requirements

17.1.2 Trainer responsibilities are but not restricted to:

- Demonstrate the job to the worker explaining the procedures, hazards and use of tools
- Allow the worker to question any aspects of the job during training
- Provide supervision as required
- Coach and test the worker with questions about their knowledge of critical point checks
- Review and reinforce the performance, correct errors and question a technicians understanding of concepts and procedures
- Set up a schedule for performance reviews and evaluating performance objectives
- Ensure the curriculum is fully covered at each level of the worker's training
- Sign-off on hours for training that has been completed
- Assist with the evaluation process as required
- Assist with the ongoing development of training requirements of valve technicians
- Continue ongoing personal development of skills and knowledge of themselves and those they are responsible to train

17.1.3 QHSE Manager Responsibilities are but not restricted to:

- Independent testing of personnel for level advancement
- Curriculum support and evaluation
- Monitor compliance

- Audit the process

17.1.4 Employees responsibilities are but not restricted to:

- Actively participate in their personal training
- Work in compliance with the QMS, the Kings Safety Management System, and the TSSA and requirements and industry standards
- Care and maintenance of their assigned Green Book
- Ensuring that training hours are documented and signed-off
- Employees may be required to travel to other branches for additional training

17.2 Designated Trainers

17.2.1 Prerequisites

- Must have at least 2 years of experience
- Must be at least a Level 3 Valve Technician

17.2.2 Requirements

- Designated Trainers shall ensure that the curriculum supplied by Kings Energy Services is covered in its entirety at each level
- Designated Trainers shall sign-off on completed training hours
- Designated Trainers may be required to train employees at different branches
- Designated Trainers shall be required to uphold the responsibilities outlined in section 17.2.1 above

17.2.3 Authorization

- The authorization of Designated Trainers shall be approved by the President, the Director Operational Services, the QHSE Manager and Branch Manager
- Designated Trainers shall be authorized in writing and documented on the QF 17.8 Designated Trainer Authorization form

17.3 Process

The focus of the KES training program is to continually enhance the knowledge base and skill level of employees. Kings Energy Services Ltd. requires employees to function at a competency level for the task(s) they are performing. Training methods include practical application (On the job training–OJT) and theory-based education as it applies to the needs and requirements of the industry.

The Green Book in house training program as a minimum consist of training in

- Applicable ASME Codes and requirements of the Quality Manual
- Responsibilities within the Quality Manual
- Knowledge of technical aspects and mechanical skills for the position held

Each employee involved in the setting and servicing of safety/relief valves is issued a “Green Book”. The Green Book outlines the level requirements and documents completed training hours. At each level completion, the employee is required to pass a written and a practical examination to prove competency. Examination results are retained in the employee’s file.

The Valve Technician training program is subject to revision as per Green Book procedure QP 17.3. Managers / Trainers shall participate in identifying tasks which need on the job training by listing the most hazardous and most important. Managers / Supervisors will work with Quality Control to develop standards for each job including regulatory requirements, industry practices, time frames and all special conditions.

Where the Green Book program cannot be followed then a PRD Technicians previous or current experience/knowledge can be used as long as the Technician can successfully demonstrate both written and practically to the Division Manager that they are at the next level, also see 17.4

17.3.1 Training Verification

Once the hours required per technician level in the Green Book have been completed, employees will undertake a standardized written exam which will be scored by an impartial member of KES administration. Level advancement also requires the successful completion of a practical exam to be evaluated by a Green Book Committee representative, primarily the Director Operational Services and maybe assisted by the Branch Manager (or designee), and the Designated Trainer or the QHSE Manager.

17.3.2 Training Follow Up

Division/Department Manager-Valve Servicing/Team Lead PSV and Valve Trainers will annually review the qualifications of all personnel referenced by this quality system manual to verify proficiency, training objectives, and compliance to the quality manual. This review will be documented and placed in the assessed workers training file. A copy of all training documents will be retained in the personal records of the individual being trained.

17.3.3 Training Reporting

The Branch Manager or designee will ensure that attendance for on premises training sessions is recorded on the appropriate training form QF17.5 Training Record and in the employee's Green Book as applicable. Copies of records will be retained in the file of each employee attending the training session.

17.4 New Hires

Competency requirements and the training needs of new employees shall be assessed and documented during a new hires probation period on the QF 17.7 PRD Technician Level Current Employee or New Hire by the Branch Manager or designee. New hires who have prior experience in the setting and servicing of safety/relief valves may not require training for all elements covered in the Valve Technician training program provided the prior training can be confirmed or that the employee is tested/examined to verify competency, this effort will be documented and remain as part of the employee training file. All new hires will be provided with QMS and Safety training regardless of prior experience.

17.5 Specialty Training

In some cases, an individual may be hired with the sole purpose of filling a specific job position. In this case, they will be individually trained in this position and supervised at all times in respect to how the valves function, manufacturer test procedures and all codes that may apply to each

style of valve until such time that total competence has been demonstrated and documented on the QF 17.9 Specialized Trainer Authorization form **(SV19 29.0)**.

17.5.1 Specialized Trainers

In some instances, individuals may be authorized to train employees in defined areas of specialization. Specialized Trainers shall be authorized by the President, the Director Operational Services and the QHSE Manager.

17.6 Technician Levels

Level 1 Shop Hand:	To Listen and Assist; Dismantling/cleaning of valves.
Level 2 Valve Technician:	To Learn and Apply; Dismantling/ assembly, lapping and testing
Level 3 Valve Technician:	To Work Independently; this level is expected to perform most tasks unsupervised.
Level 4 Valve Technician:	To Lead and Mentor; A Level 4 must possess mechanical competence in dismantling, assembling, lapping, testing of valves and machining. Competency with OEM literature and industry standards is required. This level is expected to take a leadership role in the training program.

Annex E

Technical Standards and Safety Authority Addendum

SV18 Internal Audit

18.0 Scope

Kings Energy Services Internal Audit Program outlines a system for planning, conducting, and documenting audits for all applicable documented procedures to ensure compliance with all aspects of the QMS, the Codes and Standards and the TSSA Safety Standards Act as they pertain to the pressure equipment industry.

Internal Audits are a management tool for monitoring and verifying implementation of systems and processes and to determine areas for improvement. This location will be quality audited at a minimum of no less than once per year.

18.1 QHSE Manager Responsibilities;

- Leading all aspects of the audit
- Scheduling audit teams and audit team leader
- Maintaining internal audit files
- Reviewing audit documentation and reporting audit findings to Senior Management
- Enforcing any required changes in documented procedures and policies in the QMS after a review of audit findings
- Providing Corrective actions and ensuring follow up

18.2 Qualified Auditors:

- QHSE Manager and/or individuals that have performed successful audits with the supervision of the QHSE Manager may be selected as auditors
- Selected individuals are expected to have, at least, training and work experience in the QMS functions
- Only “non-biased” individuals can be selected as auditors
- Auditors must never audit their own work

18.3 Audit Objectives:

- To verify all QMS elements are effectively developed and implemented to meet the TSSA Safety Standards Act and Regulations and manufacturers requirements for the PRD being repaired or serviced
- Verify through observation and evaluation of all QMS related documentation that procedures and policies are being implemented in accordance to the requirements set forth in the QMS
- To continue to identify strengths and weaknesses, whether they are operational or technical aspects of any component of the QMS

18.4 Audit Implementation:

- The QHSE Manager will annually draft an audit schedule. The schedule will include input from Senior Management and any applicable departments or sites. Internal Audits scheduled at a minimum of once per year.
- All pertinent information will be recorded and filed.
- In addition to scheduled audits, random audits may be performed at any time, especially in cases of inconsistent performance, ineffective controls, or an unsatisfactory product.

18.5 Reporting

An Audit Report will be completed within a maximum 14 days from the completion of the audit. The completed report will be sent to the Auditee(s) with an outline of strengths and weaknesses and when applicable required corrective actions and expected resolution dates. Early follow up is essential so the non-conforming procedure or part is corrected quickly to prevent similar events.

15.5.1 Acknowledgement

Division Managers, the Director Operational Services and the President will acknowledge all internal audit reports. The QHSE Manager track the progress of all Corrective Actions

18.6 Audit follow up and File Management:

The Audit leader will contact Auditee(s) within 2 days of sending the audit report and confirm the receipt of the report and discuss required actions. Follow-up may be planned including.

- Re-audit
- Review of corrective action and documentation
- Interview of personnel

Once the audit is complete all applicable records and documents will go to the QHSE Manager who will

- File all audit documents in the appropriate file
- Update all applicable information
- Retain all records for 5 years