SLOVENSKI STANDARD
oSIST prEN ISO 12747:2024

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Naftna in plinska industrija, vključno z nizkoogljično energijo - Transportni cevovodni sistemi - Priporočene prakse za podaljšanje življenjske dobe cevovodov (ISO/DIS 12747:2024)

Oil and gas industries including lower carbon energy - Pipeline transportation systems - Recommended practice for pipeline life extension (ISO/DIS 12747:2024)

Erdöl- und Erdgasindustrie - Rohrleitungstransportsysteme - Empfohlene Maßnahmen zur Verlängerung der Lebensdauer einer Rohrleitung (ISO/DIS 12747:2024)

Industries du pétrole et du gaz y compris les énergies à faible teneur en carbone - Systèmes de transport par conduites - Pratique recommandée pour prolonger la durée de vie des conduites (ISO/DIS 12747:2024)

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75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment

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ISO/DIS 12747

Oil and gas industries including lower carbon energy — Pipeline transportation systems — Recommended practice for pipeline life extension

ICS: 75.200

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 2, *Pipeline transportation systems*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Within ISO/TC 67/SC 2 there has been a series of discussions concerning both the needs and level of prescription required to address pipeline life extension issues. These have highlighted that:

— operators are applying differing approaches, which leads to inefficient use of both operator and authority resources.

— the assessment and upgrading of existing facilities have been based on probabilistic or reliability-based methods.

— the level of detail delivered varies.

The purpose of this document is to address the above concerns by providing a consistent approach to pipeline life extension assessment that can be applied by operators (or parties acting on their behalf) across the industry.

This document is concerned with the proof of structurall integrity of the pipeline system for the justification of extended operation. Integrity management is not covered in detail. However, the interface between a PIMS and the life extension process is considered because

— a PIMS, where present, forms an integral part of the integrity assessment of the pipeline system.

— a PIMS of some form is required for operation in extended life.

Factors affecting the future operability of the system but not the structural integrity, such as the loss of a control umbilical, are flagged as requiring assessment but are not addressed in full in this document.

Whilst this document is aimed primarily at the pipeline operators, it can also be of interest to other stakeholders such as

— regulators approving the life extension application.

— members of the public affected by the life extension application, such as other users of maritime waters, landowners and developers.

Considering this, an overview of the life extension process and the key principles involved is given in Clause 5. The remainder of the document is intended to provide detailed guidance to those performing the life extension assessments. Case studies are also provided to illustrate the application of the lifetime extension process described in this standard, along with lessons learned that may aid the user in the performance of similar studies. All guidance is provided for use in conjunction with sound engineering practice and judgment.

This document is not intended for use as a design standard.

Oil and gas industries including lower carbon energy — Pipeline transportation systems — Recommended practice for pipeline life extension

1 Scope

This document gives guidance on how to assess the feasibility of extending the service life of a pipeline system, as defined in ISO 13623, beyond its specified design life. Pump stations, compressor stations, pressure-reduction stations and depots are not specifically addressed in this document, as shown in Figure 1.

This document applies to both onshore and offshore rigid metallic pipelines and risers (including SCRs). It is not directly applicable to the following:

— flexible pipelines;

— pipelines constructed from other materials, such as glass reinforced plastics or polymers;

— umbilicals (control and / or chemical conveyance service);

— topsides equipment and piping (outside of pipeline system limits defined in accordance with local regulatory requirements);

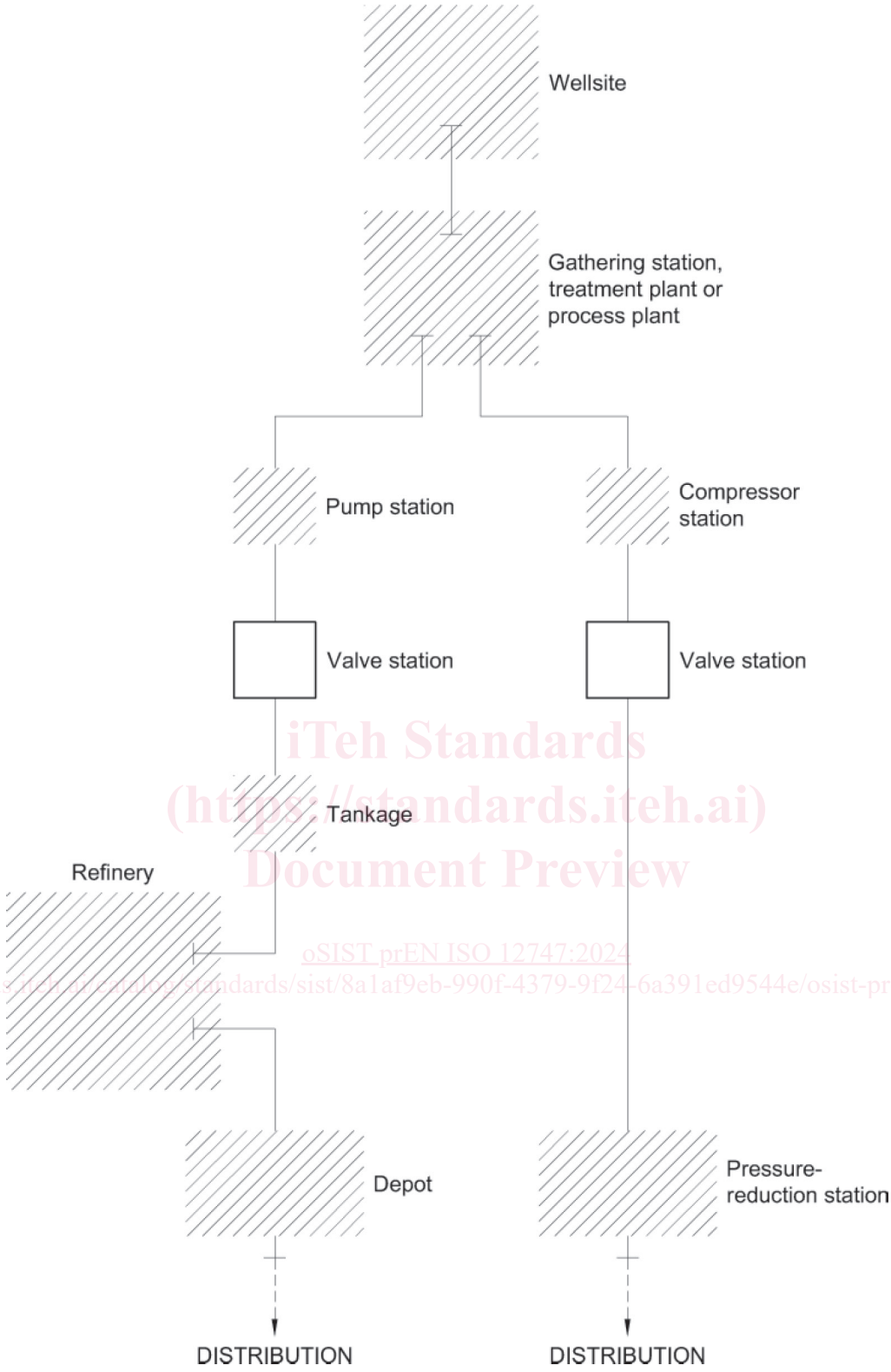
— pipeline protection and support structures and components.

NOTE 1 The assessment process defined in clause 5.3 can be applied in the lifetime extension assessment of the above at the discretion of the user. As an example, guidance on use of the process for lifetime extension of unbonded flexible pipe is provided in Annex A.

NOTE 2 Further guidance on the lifetime extension of subsea systems, including umbilicals and topsides equipment, is provided in NORSOK U-009.

NOTE 3 Although the life extension of structures and structural elements is not addressed in this standard, the continued fitness-for-service of structures having a direct impact on the structural integrity of the pipeline system shall be considered throughout any period of extended operation. This shall include assessment of the implications of structural degradation on pipeline system integrity. Further guidance can be found in NORSOK N-006.

This document addresses life extension, which is a change to the original design premise. It is also applicable to other changes to the design premise, such as MAOP re-ratings or a change to the conveyed fluids, at the discretion of the user. Guidance on the latter is provided in Annex B, given the potential for extension to operating life of a pipeline system being solely dependent on a change in operating fluids (such as when considering re-use of a pipeline for CCUS or for hydrogen transportation).



Key

pipeline systems covered by ISO 12747

connection with other facilities

pipeline not covered by ISO 12747

station/plant area or offshore installation not covered by ISO 12747

Figure 1 — Extent of pipeline systems covered

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13623, *Petroleum and natural gas industries — Pipeline transportation systems*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
acceptance criteria
specified indicators or measures employed in assessing the ability of a component, or system to perform its intended function.

3.2
ancillary equipment
components attached to pipe or piping within the pipeline system with additional functions to the conveyance of fluid, such as to monitor pipeline parameters or control pipeline conditions / flow. This includes valves, pressure indicators, temperature gauges, corrosion probes, SCR flex joints etc.

3.3
anomaly
discrepancy or deviation of an element of the pipeline system from the established rules and limits

3.4
anomaly limits
criteria set as part of the design and PIMS processes to enable determination of anomalies.

3.5
design life
period for which the design basis is planned to remain valid.

[SOURCE: ISO 13623]

3.6
failure
event in which a component or system does not perform according to its operational requirements.

3.7
flow assurance
ensuring successful and economical flow of fluid through the pipeline system

3.8
high integrity pressure protection system
mechanical overpressure protection system that rapidly isolates the pipeline if there is a risk of exceeding the maximum allowable operating pressure (MAOP)

3.9
life extension
additional period beyond the original service life for which the pipeline system can be operated safely.

Note 1 to entry: Life extension is considered as a modification to the design premise.

3.10
location class
geographic area classified according to criteria based on population density and human activity.

[SOURCE: ISO 13623]

3.11
maximum allowable operating pressure
maximum pressure at which the pipeline system, or parts thereof, is allowed to be operated.

[SOURCE: Adapted from ISO 13623]

3.12
operation
activities involved with running and maintaining the pipeline system in accordance with the design premise.

3.13
operator
party ultimately responsible for the operation and integrity of the pipeline system.

3.14
pipeline integrity management system
management system designed to ensure the safe operation of a pipeline system in accordance with the design intent, by control of the physical condition of a pipeline, the operating conditions within the system and any changes made to the system.

3.15
pipeline
those facilities through which fluids are conveyed, including pipe, pig traps (where present), components and appurtenances, up to and including the isolating valves.

[SOURCE: Adapted from ISO 13623]

Note 1 to entry: The definition of pipeline limits can vary by design standard, geographical region, and operator designation under PIMS. However, the definition above applies within this standard. Examples of selected facilities are provided below.