In-line inspection contractor compliance check

Recommended Practice

POF 320

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PIPELINE
OPERATORS FORUM

Foreword

The objective of In-line inspection (ILI) is to obtain data on the pipeline condition, deformation or routing as part of the baseline and/or revalidation process. ILI is typically performed with specially designed and built tools that are based on one or more non-destructive technologies such as ultrasonic, magnetic flux leakage, eddy current, mechanical arms, inertial measurement and other. These tools gather a large amount of data that require interpretation and evaluation of well-trained specialists. Calibration of the tools is another important step for correct interpretation of data collected.

Designing, building, operating of ILI tools and interpretation, evaluating of the collected data is typically (but not always) carried out by a single ILI contractor.

This recommended practice on ILI contractor compliance check has similarities with an audit procedure and can be used by pipeline operators as an initial step to find an ILI contractor that can provide tools, technologies and services in compliance with industry accepted standards.

This document has been reviewed and approved by the Pipeline Operators Forum (POF) and is based on knowledge and experience available from POF members and others at the date of issue. It is stated however, that neither POF nor its member companies (or their representatives) can be held responsible for the fitness for purpose, completeness, accuracy and/or application of this document.

Comments on this specification and proposals for updates may be submitted to the Administrator at specifications@pipelineoperators.org with the form which is available on the POF website (www.pipelineoperators.org).

Changes November 2021

The purpose of this revision is to comply with the new POF document numbering system. Changes consist of updated references to other POF documents. In addition, editorial corrections may have been made.

Table of Contents

1 Scope

The scope of this compliance check document is to provide to the pipeline operators community a common baseline document to support the review of inspection companies that offer and operate in-line tools for the inspection of metallic pipelines.

This review should indicate whether a specific contractor can comply with client's requirements and industry standards such as e.g. API 1163 [1] and POF 100 [3]. This document is written in such a way that both the pipeline operator as well as a third party could use this document for the compliance check.

This document covers the key points to be reviewed by both the pipeline operator and the In-Line Inspection (ILI) contractor, in order to provide assurance that the inspection contractor is likely to be able to supply services to an acceptable standard under an inspection agreement.

The compliance review process may be used as the first step in the selection process of an ILI contractor for inspection of pipelines and can be used in the following situations:

1. A new inspection contractor, i.e. an ILI contractor which has not worked for the operator or has not been evaluated yet.
2. An inspection contractor which has not worked for the operator recently and/or is not familiar with new processes and requirements from the client.
3. After a previous compliance check (typically 3 - 5 years or according to operator policy) to verify that an inspection contractor is still compliant.

The information obtained from the compliance check should be evaluated by the operator where after the decision can be taken to approach the contractor for a pipeline inspection project or contract. This document therefore should be used prior to detailed and technical discussions for a pipeline inspection project.

Prior to approaching the contractor for a specific inspection project or contract, an additional field operation visit might be proposed and added by the operator or the contractor to witness specific phases like e.g. tool loading/extraction, tool cleaning, compliance to procedures, safety etc.

The scope of this contractor compliance check procedure typically covers areas such as HSE, QA and technical capabilities. Financial aspects are not covered, but managerial subjects related to the ILI activity organisation between operator and contractor might be subject of discussion as well as main topics of terms of purchase. Detailed financial, contractual and operational aspects should be considered separately prior to awarding a contract.

2 List of definitions, abbreviations and acronyms

For the purpose of this document, the definitions, abbreviations and acronyms as listed below apply.

2.1 Definitions

Contractor	Any organisation providing ILI or other pipeline inspection services to clients
Operator	Pipeline operator, i.e. pipeline owner, pipeline manager or client
Reviewer	Person that carries out the compliance check on behalf of the Operator

2.2 Abbreviations and acronyms

AGM	Above Ground Marker
ATEX	ATmosphères EXplosibles (Explosive atmospheres)
EC	Eddy Current
EMAT	Electro-Magnetic Acoustic Transducer
FFS	Fitness for Service
GPS	Global Positioning System
ILI	In-line Inspection
IMU	Inertial Measurement Unit
MFL	Magnetic Flux Leakage
QA	Quality Assurance
SCU	Speed Control Unit
UT	Ultrasonic Testing

3 ILI contractor compliance process

The ILI compliance check may be completed in six (6) stages, the schedule below is considered a good practice:

1. General meeting.
2. Compliance tables to be forwarded to ILI contractor for completion as far as possible.
3. Completed compliance document to be returned to pipeline operator.
4. Visit to the technical facilities of the ILI contractor.
5. Technical meeting and further completion of the compliance document (optionally to be combined with the visit to the technical facilities).
6. Feedback of findings and (if applicable) agreed follow-up actions.
7. An additional stage might be proposed and added by the operator or the contractor, like an additional field operation visit to witness specific phases like e.g. tool loading/extraction, tool cleaning, compliance to procedures, safety, managing sub-contractors etc.

3.1 General meeting

The general meeting is considered to be the first contact between the operator and contractor. The intention is to discuss the available capabilities and technologies of the contractor in relation to operator's pipelines, inspection and reporting requirements and if required follow-up activities. As such, this meeting can be regarded as a step prior to the actual compliance check process and from this meeting the operator should decide if a compliance check will be carried out.

If a compliance check is foreseen, this should be agreed with the contractor and the person that carries out the compliance check on behalf of the operator is, for the purpose of this document, called the “Reviewer”.

3.2 Compliance check tables

The compliance check tables (POF 321 [7]) are to be completed with information from the contractor, whereby the information requested in section 4 is for informative proposes only and is not to be checked for compliance with any standard.

Sections 5 to 10 summarise the information to be supplied by the contractor that should be checked for compliance with documents as indicated.

Tables are prepared where the information from the contractor is requested. The numbering of the tables is based on the chapter numbering of the document and as such, in Table 4 general contractor information is requested. In Tables 5 to 10 information is requested that should be checked by the Reviewer and/or operator for compliance with documents as listed in columns 1 and 2.

3.3 Completion of tables

It is advised to forward POF 321 to the contractor with the request to complete it prior to the technical meeting. As Tables 5 to 10 comprise information that need to be checked for compliance with requirements as listed in documents, the Reviewer should check the information and related contractor documents. The Reviewer is requested to give or add a descriptive statement that reflects their observation and if required a recommendation.

In the last column of Tables 5 to 10 a “verdict” statement is requested from the Reviewer indicating if the contractor is compliant for the item considered. Therefore, the statement in this column should be "Compliant" (C), "Not Compliant" (NC), "Not Applicable" (NA) or "Action Required” (AR).

Final completion of the document should be done by the Reviewer and will typically be carried out during the technical meeting (step 5, see also chapter 3.5 below).

All information should be provided in the English language, unless agreed otherwise between parties.

3.4 Visit to the technical facilities

The visit to the technical facilities of the ILI contractor can be carried out by the operator or a third party and is intended to give the Reviewer key insights of the facilities and capabilities of the contractor. Typical departments to be visited are:

- Design department
- Machining workshop
- Operations department: Planning, Transport
- Data analysis department
- Maintenance department
- Pull/pump test facilities

3.5 Technical meeting

The completed POF 321 tables as received from the contractor should be reviewed during the technical meeting.

The Tables 4.1 to 4.8 should be checked for completeness and accuracy. Additional information or explanation might be requested and could be added.

The information in Tables 5 to 10 should be checked and completed by the Reviewer during discussions with specialists from the contractor. The Reviewer should complete the tables and advise if the observations are in compliance with the reference documents and/or recommend actions (see also chapter 3.3).

During the technical meeting, the Reviewer should also explain the ILI activity organization between the operator and the contractor. For example, the Reviewer has to explain the global process implemented at the operator like scheduling of inspections, schedule for 1 survey (purchase order, kick-off meeting, operations, reports, dig ups and feedback meeting if any) and onsite relationship between the operator and the ILI contractor.

The operator may also present the main topics of terms of purchase to start an exchange about this topic before building any contract.

3.6 Feed back

It is advised that the Reviewer summarises the findings and verdict at the end of the technical meeting. Recommended actions should be discussed and possibly a time schedule agreed.

4 Contractor information

In this section contractor information is requested on the locations where the contractor's headquarter(s), development centre(s) and regional offices are. It should be indicated what services are available from the various locations and what location will be visited for the compliance check.

4.1 Contractor addresses

Information on the contractor addresses is requested in the Table 4.1.

4.2 Organisation

Organisational information and information of key persons for the location to be visited is requested in Table 4.2.

4.3 Technical facilities

Information on available technical facilities such as pump and pull test equipment is requested in Table 4.3. An independent or subcontracted third party test facility can also be listed here.

4.4 Tools and technologies, general overview

An overview of the available tools, technologies and combinations thereof for each range of pipe diameters and thickness is requested to be given in Table 4.4. If applicable, this table can be completed and expanded with additional (not listed) technologies. Also, a remark can be added for extra information.

4.5 Details of inspection tools and technologies

Information on the technical details of available tools is requested in Table 4.5.1 to 4.5.12 for the various type of tools as listed below. Tables are prepared for technologies that are considered to be available from 3 or more ILI contractors. Details of tools based on other technologies and/or special tools can be added in Table 4.5.12 and if required, extra tables (POF 322 [8]) can be downloaded from the POF website.

4.5.1 Gauging and cleaning tools

4.5.2 Geometry tools

4.5.3 MFL tools, Axial magnetisation

4.5.4 MFL tools, Circumferential magnetisation

4.5.5 UT tools, Compression wave, Wall thickness measurement

4.5.6 UT tools, Shear wave, Crack detection and sizing

4.5.7 EMAT tools, Wall thickness measurement

4.5.8 EMAT tools, Crack detection and sizing

4.5.9 Eddy current tools

4.5.10 Mapping tools

4.5.11 Leak detection tools

4.5.12 Special and other technology tools

4.6 Complementary services

Complementary and additional services, that are available from or via the ILI contractor, are requested to be indicated in Table 4.6. This table can be expanded and completed with additional (not listed) services.

4.7 ILI tool running information and performance statistics

Information on the number and kilometres of pipelines inspected and ILI performance statistics of the last 5 year are requested to be supplied in Table 4.7.

4.8 Contractors' clients

An overview of contractors' clients and the provided services is requested in Table 4.8.

5 Health, safety and environment

Information on health, safety and environmental performance aspects is requested to be supplied in Table 5.

6 Quality

Information on the applicable quality assurance system and relevant certification is requested to be supplied in Table 6.

7 Personnel

Personnel operating the ILI systems and personnel handling, analysing and reporting the inspection results should be qualified and certified according to the latest version of document ANSI/ASNT-ILI-PQ-2017 [2]. If an alternative qualification scheme is in use, a comparison table should be constructed and reviewed for equivalency.

In addition to the qualification levels, POF 100 [3] (POF specs) requires key personnel to have certain qualifications or experience.

To support development of ILI tools and verification of defects detected in pipelines, general NDT techniques might be used for these activities and personnel might be available with general NDT qualifications for e.g. the ultrasonic technology (e.g. ISO 9712, Non-destructive testing — Qualification and certification of personnel or SNT-TC-1A, Personnel Qualification and Certification in Non-Destructive Testing).

In this section the qualification requirements of personnel is listed.

7.1 General requirements and documents

General information and documents regarding personnel qualification are to be supplied in Table 7.1.

7.2 Tool operations

The number and qualifications of tool operators available and qualified should be indicated in Table 7.2. Level of qualification should be as described in document ANSI/ASNT-ILI-PQ-2017.

7.3 Data interpretation and analysis

The number and qualifications of data analysts available and qualified should be indicated in Table 7.3. Level of qualification should be as described in document ANSI/ASNT-ILI-PQ-2017.

7.4 Assigned personnel for field operations, data analysis and reporting

Compliance to reference document for the qualifications of assigned personnel for specific activities is requested to be completed in Table 7.4.

8 Technical requirements of ILI tools

Compliance to reference documents for technical requirements of available ILI tools is requested to be completed in Table 8.

9 Operations and project management

Compliance to reference documents for operations and project management is requested to be completed in Table 9.

10 Reporting

Compliance to reference documents for ILI reporting is requested to be completed in Table 10.

11 Field operations visit (optional)

Observations of specific aspects made during the optional field operations visit can be recorded in Table 11.

12 ILI test run (optional)

Before contracting for several years or for several operations, the operator may propose to the contractor to perform an operation test with a dedicated contract. This test should allow both parties to learn how to work together and for the operator to check if the contractor understands and respects the technical requirements and timescales for delivering reports.

If possible, the test run can be performed in a pipeline with known anomalies and / or features typically of interest for the operator. Alternatively, an extra pipe spool with typical features could be fitted in the pipeline during the test run. Based on such a test run all stages of ILI tool application can be reviewed and information on tool applicability, pass through, feature recognition, sizing and finally reporting can be evaluated.

13 References

1. API 1163, *In-Line Inspection Systems Qualification*, American Petroleum Institute, 2nd Edition, April 2013, reaffirmed August 2018.
2. ANSI/ASNT-ILI-PQ-2017, *In-line Inspection Personnel Qualification and Certification*, American Society for Non-destructive Testing, 2017.
3. POF 100, *Specifications and requirements for in-line inspection of pipelines, Version 2021*, Pipeline Operators Forum, 2021.
4. ISO 9001, *Quality management systems - Requirements*
5. OHSAS 18001, *Occupational Health and Safety Assessment Series*
6. ISO 14001, *Environmental management systems - Requirements with guidance for use*
7. POF 321, *In-line inspection contractor compliance check – Tables*, Pipeline Operators Forum, 2021
8. POF 322, *In-line inspection contractor compliance check – Extra table*, Pipeline Operators Forum, 2021