TR Number	**19-60**
Primary Reference	192.921
Purpose	Review and develop GM as appropriate in light of Amendment 192-125
Origin/Rationale	Amdt. 192-125
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Note: *Revisions are shown in yellow highlight and red font.*

Section 192.919

1 GENERAL ...

2 IDENTIFYING POTENTIAL THREATS ...

3 SELECTING ASSESSMENT METHOD

(a) The method(s) selected must be appropriate to address all the identified threats applicable to the covered segment being assessed.

(b) It may be necessary to consider a combination of tools or techniques of integrity assessment to directly address the primary threats. Table 192.919i may be used as a guide to identify appropriate assessment methods for the various primary threats. Additional information can be found in ASME B31.8S–2004, Section 6 (see listing in §192.7, not IBR for §192.919).

(c) To determine the most appropriate assessment method(s) for identifying anomalies associated with specific threats for the covered segment, consideration should be given to documenting the basis for method selection. Assessment methods and some reasons for choosing them are as follows.

(1) In-line inspection (ILI). ...

(2) Pressure test.

(i) Expected anomalies and inspection objectives.

(ii) Construction, design, or operating characteristics of covered segment.

(iii) Gas supply deliverability.

(iv) Accessibility to the supply and disposal of test medium.

(v) Location of pipeline segment with regard to environmentally sensitive areas.

(vi) Ability to conduct pressure test in according with the requirements of 49 CFR Part 192, Subpart J.

(vii) A hydrostatic test meeting Subpart J requirements is sufficient to demonstrate that manufacturing and construction defects will remain stable at the operating pressures related to that test. Operators do not need to consider the operating pressure in the five years preceding HCA identification for segments that have passed a hydrostatic test in accordance with Subpart J.

(3) Direct assessment.

(i) Expected anomalies and inspection objectives.

(ii) Construction, design, or operating characteristics of covered segment.

(iii) Ground overlay (e.g. asphalt, concrete) above covered segment.

(iv) If direct assessment methods are used, develop direct assessment plans describing how they will be used.

(v) Ensure indirect inspections can be made over the entire length of an ECDA region with both complimentary tools.

(4) Other technology.

(i) When an operator plans to use other technology in accordance with §192.921(a)(4), the operator needs to notify and provide documentation demonstrating the appropriateness of the technology to PHMSA-OPS at least 180 days before conducting an assessment using such a method.

(ii) Ensure that state or local pipeline safety authorities are notified 180 days before conducting the assessment on an intrastate covered segment.

(d) Inspection using any of the methods identified in Table 192.919i may not be appropriate for certain threats, such as Third-Party Damage, Equipment Defect, Weather Event, or Incorrect Operations.

For these threats, other actions such as prevention and mitigation may provide better integrity management results. See §192.935.

(e) In selecting an assessment method for the threat of third-party damage, the operator should consider the following.

(1) If the threat of a future third-party damage event is expected to be present in covered segments. In such cases, prevention of future events is better addressed under the requirements for preventive and mitigative actions.

(2) If as part of a baseline assessment or reassessment, the operator has gathered data from an ECDA or internal-inspection tool survey correlating to third-party damage.

...

ASSESSMENT APPLICABILITY

(Based on ASME B31.8S-2004, Section 6 — see §192.7 for IBR)

Threat abbreviations:

EC – External Corrosion
MFG – Manufacturer Defect
EXD – Excavation Damage
IC – Internal Corrosion
CON – Construction Defect
WOF – Weather Related & Outside Force
SCC – Stress Corrosion Cracking
EQP – Equipment Defect
IO – Incorrect Operation

Assessment Methods	Primary Threats								
	EC	IC	SCC	MFG	CON	EQP	EXD	WOF	IO
In-Line Inspection (ILI) Tools									
Magnetic Flux Leakage, Std Res.	X	X							
Magnetic Flux Leakage, High Res.	X	X					X		
Ultrasonic Compression Wave	X	X		X			X		
Ultrasonic Shear Wave Tool	X	X	X	X			X		
Transverse Flux	X	X		X			X		
Deformation or Geometry					X		X	X	
Pressure Test	X	X	X	X	X	X			
Spike Hydrostatic Pressure Test			X	X					
Excavation and In-situ Direct Examination	X	X	X	X	X	X	X	X	X
Guided Wave Ultrasonic Testing (GWUT)	X	X							
Direct Assessment									
ECDA [1]	X						~~X~~		
ICDA		X							
SCCDA			X						
Confirmatory Direct Assessment [2]	X	X							

[1] ECDA can discover coating damage, including that caused by excavation activities; however, ECDA does not directly identify excavation damage.

[2] Confirmatory direct assessment can be used for assessments conducted at no longer than seven-year intervals when reassessments conducted using ILI, Pressure Test, or DA specified methods are scheduled to occur at intervals longer than 7 years, and when the threats of concern are corrosion.

TABLE 192.919i

4 INTEGRITY ASSESSMENT SCHEDULE ...

Section 192.921

Note: References to ASME B31.8S throughout this section of guide material are specific to the edition of ASME B31.8S as incorporated by reference (IBR) in §192.7. See 3.2 of the guide material under §192.907.

1 ASSESSMENT METHOD

~~One, or more, of the methods listed below can be used for the assessment method. See Table 192.919i for related assessment applicability of (a), (b), and (c) below.~~

One, or more, of the methods listed below must be used to address each threat to which a covered segment is susceptible (§192.921(a)). See 3 of the guide material under §192.919 and Table 192.919i for related assessment applicability of (a), (b), (c), (d), (e), and (f). (See 7 of the guide material under §192.921 for plastic pipe.)

(a) In-line inspections (ILI).
(b) Pressure testing.
(c) Spike hydrostatic pressure test.
(d) Excavation and in-situ direct examination.
(e) Guided wave ultrasonic testing (GWUT).
(~~c~~ f) Direct Assessment (DA).
(~~d~~ g) Other technologies.

1.1 In-line inspection.

(a) In-line inspections of pipelines must comply with API STD 1163, ANSI/ASNT ILI-PQ, and NACE SP0102. (§192.493).

~~(a) Threat assessments.~~
~~Applicable ILI tools can be used to assess the following threats.~~
~~(1) External corrosion.~~
~~(2) Internal corrosion.~~
~~(3) Stress corrosion cracking.~~
~~(4) Manufacturing defects.~~
~~(5) Construction defects.~~
~~(6) Excavation damage.~~
~~(7) Weather and outside forces.~~

~~(b) ILI tools.~~
~~Applicable tools and threats are listed in ASME B31.8S, Paragraph 6.2. Tools listed in that paragraph represent tested technology for the threats which the tools are capable of detecting. Other tools might meet the requirements of ASME B31.8S, Paragraph 6.2, provided they have a history of success and are capable of detecting the appropriate threat over the full length and circumference of the segment. If the tool does not have a history of success, it might be considered "other technology" and the requirements for using other technologies would need to be met.~~

(~~c~~ b) Advantages of ILI.
(1) Assessments can generally be conducted without taking the pipeline out of service.
(2) Long segments of pipe can be assessed in a single run.
(3) More than one threat can be addressed in a single run.
(4) Multiple tools can be run at the same time.
(5) May assess multiple HCAs in a single run.

(~~d~~ c) Disadvantages of ILI.
(1) Extensive pipe modifications ~~may~~ might be required (e.g., installation of launcher/receiver, removal of restrictions).
(2) Flow rates and pressures must be within an acceptable range.
(3) Multiple tools ~~may~~ might be needed to address multiple threats.
(4) Pipeline ~~may~~ might need to be internally cleaned.
(5) Some tools require a liquid couplant.
(6) Potential for s~~S~~cheduling limitations ~~may include~~ (e.g., service interruptions, ~~and~~ tool availability).
(7) Potential for failure or malfunction of ILI equipment.

(~~c~~ d) For information on ILI tools and their use, see Guide Material Appendix G-192-14.

1.2 Pressure testing.

~~(a) Threat assessments.~~

~~Pressure testing can be used to assess the following threats.~~

~~(1) External corrosion.~~
~~(2) Internal corrosion.~~
~~(3) Stress corrosion cracking.~~
~~(4) Manufacturing defects.~~
~~(5) Construction defects.~~
~~(6) Equipment defects.~~

(~~b~~ a) Advantages of pressure testing.

(1) Extensive pipeline modifications are generally not required.
(2) Results are easy to interpret.
(3) Multiple threats can be addressed at one time.

(~~c~~ b) Disadvantages of pressure testing.

(1) Pipeline must be taken out of service.
(2) Acquisition and disposal of test medium.
(3) Assessment provides only a pass/fail result.
(4) Provides no information on non-critical defects (e.g., a 50% corrosion pit that did not fail).
(5) Hydrostatic test dewatering and drying.
(6) A failure during a pressure test ~~may~~ might present safety and environmental risks.
(7) Elevation changes ~~may~~ might limit the amount of pipe that can be assessed in a single test.
(8) Pressure testing could propagate existing flaws.
(9) Scheduling limitations.

(~~d~~ c) Test pressure.

In addition to considering the requirements of Subpart J, the operator may consider the reassessment interval indicated in ASME B31.8S, Section 5, Table 3 when choosing a test pressure. Choosing a test pressure higher than the pressure required by Subpart J ~~may~~ might allow for a longer reassessment interval.

(~~e~~ d) Conducting pressure tests.

See guide material under §§ 192.503, 192.505, ~~and~~ 192.919, and ~~plus~~ Guide Material Appendices G-192-9 and G-192-9A.

1.3 Spike hydrostatic pressure test.

(a) Advantages of spike hydrostatic pressure testing.

(1) Extensive pipeline modifications are generally not required.
(2) Results are easy to interpret.
(3) Multiple threats can be addressed at one time.
(4) Minimizes size of non-critical defects (e.g., a 50% corrosion pit that did not fail).
(5) Generally, stops or stabilizes crack growth and avoids continued subcritical crack growth.

(b) Disadvantages of spike hydrostatic pressure testing.

(1) Pipeline must be taken out of service.
(2) Acquisition and disposal of test medium.
(3) Assessment provides only a pass/fail result.
(4) Hydrostatic test dewatering and drying.
(5) A failure during a pressure test might present safety and environmental risks.
(6) Elevation changes might limit the amount of pipe that can be assessed in a single test.
(7) Scheduling limitations.

(c) Conducting spike hydrostatic pressure tests.

See guide material under §192.506 ~~plus~~ and Guide Material Appendix G-192-9A, Section 3.4.

1.4 Excavation and in-situ direct examination.

(a) Nondestructive examination (NDE) methods recognized in §192.921(a)(4)

(1) Ultrasonic testing.
(2) Phased array ultrasonic testing.
(3) Inverse wave field extrapolation.
(4) Radiography.
(5) Magnetic particle inspection (MPI).

(b) Other recognized NDE methods
- (1) Dye penetrant.
- (2) Visual.
- (3) Alternating current field measurement.
- (4) Pipe coating inspection.
- (5) Adhesion testing.
- (6) Three-dimensional laser profile measurement.
- (7) NDE methods deemed appropriate by the operator.

(c) Advantages of excavation and in-situ direct examination.
- (1) Avoid using more costly assessment methods for easily accessible pipelines.
- (2) Avoid taking pipelines out of service.
- (~~2~~3) Assess aboveground pipelines.
- (~~3~~4) Assess pipelines in pits.
- (~~4~~5) Assess small segments of pipelines.

(d) Disadvantages of excavation and in-situ direct examination.
- (1) Localized assessment of pipe.
- (2) Multiple NDE methods might be required to address each applicable threat.
- (3) Time consuming.

1.5 Guided wave ultrasonic testing (GWUT).

(a) Advantages of GWUT.
- (1) Rapid screening for in-service degradation.
- (2) Reduction in costs of gaining access.
- (3) Data is fully recorded.

(b) Disadvantages of GWUT.
- (1 Interpretation of data is highly equipment operator dependent.
- (2) Difficult to find small pitting defects.
- (3) Not very effective at inspecting areas close to appurtenances or components, such as tapping tees or valves.
- (4) Difficult to identify gradual wall loss.
- (5) ~~Doesn't~~ Does not inspect through a fitting such as valve, flange, or bend.
- (6) Limitations with certain types of pipe coatings (e.g., coal tar, field-applied wraps, concrete).

(c) Conducting GWUT.
See Appendix F of Part 192.

~~1.3~~ 1.6 Direct assessment (DA).

~~(a) Threat assessments. Needs to be reviewed still.~~
~~DA can be used to assess the following threats.~~
- ~~(1) External corrosion.~~
- ~~(2) Internal corrosion.~~
- ~~(3) Stress corrosion cracking.~~
- ~~(4) Coating damage from excavation (see §192.917).~~

(~~b~~ a) Advantages of DA.
- (1) Can be conducted without taking the pipeline out of service.
- (2) ~~May~~ Might be able to detect corrosive conditions before corrosion occurs.
- (3) Less intrusive to the operating pipeline.
- (4) Might find other threats such as coating damage from installation or excavation damage.
- (5) Evaluation of effectiveness of cathodic protection system.

(~~c~~ b) Disadvantages of DA.
- (1) ~~May~~ Might require more excavations than ILI or pressure testing.
- (2) Only addresses corrosion threats.
- (3) Requires at least 2 complementary indirect inspection tools for ECDA.
- (4) ECDA is limited in areas of cased crossings.
- (5) ~~May~~ Might not work in inaccessible locations such as large bodies of water.
- (6) ~~May~~ Might not be able to assess pipe at greater than normal depths.
- (7) ICDA requires extensive knowledge of pipeline elevations and critical angles.

(~~d~~ c) Conducting DA.
- (1) For guidance on conducting ECDA, see guide material under §§ 192.919 and 192.925.
- (2) For guidance on conducting ICDA, see guide material under §§ 192.919 and 192.927.

(3) For guidance on conducting SCCDA, see guide material under §§ 192.919 and 192.929.

~~1.4~~ 1.7 *Other technology.*

(a) Examples include the following.

(1) Running an ILI tool that does not meet the requirements of ~~ASME B31.8S, Paragraph 6.2.5(c).~~ API STD 1163, ANSI/ASNT ILI-PQ, and NACE SP0102

~~(2) Using Guided Wave Ultrasound as a stand-alone assessment method.~~

(~~3~~ 2) Using Guided Electromagnetic Wave as a stand-alone assessment method.

(b) ~~For guidance on other technology, see guide material under §192.919 and the notification requirements in guide material under §192.18.~~ An operator must notify PHMSA in advance of using the other technology in accordance with §192.18 (§192.921(a)(7)). See guide material under §192.18.

2 PRIORITIZING SEGMENTS

In general, the higher risk segments should be assessed before the lower risk segments. Based on scheduling issues and assessment methods, some lower risk segments may be assessed before higher risk segments. For example, a single ILI assessment used to assess a higher risk segment may also include one or more lower risk segments. For information on risk analysis, see guide material under §192.917.

3 ASSESSMENT FOR PARTICULAR THREATS

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