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Guidance on Practice for Inspection and Integrity Assessment of Pipeline Systems

GP 43-52

BP GROUP
ENGINEERING TECHNICAL PRACTICES

Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 43-52. This Guidance on Practice (GP) is newly created and is not based on heritage documents from the merged BP companies.

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Table of Contents

	Page
Foreword	2
Introduction	3
1. Scope	3
2. Normative references.....	3
3. Terms and definitions.....	3
4. Abbreviations	3
5. Inspection overview	3
5.1. General.....	3
5.2. Inspection plan.....	3
5.3. Identification of threats.....	3
5.4. Critical feature sizing.....	3
5.5. Inspection frequency	3
6. Selection of inspection methods.....	3
7. Structural reliability analysis (SRA)	3
8. Assessment of reported features	3
8.1. PDAM	3
8.2. Use of ILI data	3
9. Operators' response to discovering features.....	3
10. Pipeline records and data management.....	3
Annex A (Normative) Available assessment methods in PDAM	3
Annex B (Normative) Typical feature classification.....	3
Annex C (Informative) Inspection techniques	3
C.1. In-line inspection tools	3
C.2. Hydrotesting	3
C.3. Direct assessment	3
C.4. Onshore pipelines.....	3
C.4.1. General.....	3
C.4.2. Major crossings.....	3
C.4.3. Areas of high voltage AC interference.....	3
C.4.4. Geo-hazards	3
C.4.5. Surveillance for 3 rd party damage.....	3
C.5. Offshore pipelines.....	3
C.5.1. Landfall/ surf zone.....	3
C.5.2. Risers	3
C.5.3. Subsea installations	3
Bibliography	3



List of Tables

Table 1 - Typical onshore pipeline inspection frequency	3
Table 2 - Typical offshore pipeline inspection frequency	3

List of Figures

Figure 1 - Pipeline integrity management jigsaw	3
Figure 2 - Inspection and assessment overview	3
Figure 3 – Assessment of reported features.....	3



Introduction

Pipeline systems provide a safe and efficient means of transporting a wide range of fluids from water, oil, gas, and petroleum products, to chemicals. They are utilized in all parts of the BP Group and include upstream production flow-lines, export pipelines, chemicals, and refined products pipelines.

This document provides guidance to BP Business Units (BUs) and their projects on the requirements for the inspection, testing, and assessment of pipelines.

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1. Scope

This Engineering Technical Practice has been written for use by the Engineering Authority (EA) and the Pipeline Technical Authority (PTA). It gives guidance on the requirements for inspection and assessment of pipelines as an integral component of the PIMS.

The purpose of pipeline inspection is to establish the condition of the pipeline and verify that it is fit for continued operation throughout the life of the system. These are key requirements of GP 43-00 and of the PIMS process detailed in GP 43-49. Inspection and assessment may also be required as part of a due diligence process when assets are either acquired or transferred.

The PIMS process requires that components of the pipeline system be inspected on a regular basis. The primary focus of this GP is inspection of pipelines from pig trap to pig trap. As such there are many components of pipeline systems that are not covered by this GP. Inspection of pipeline system components such as tanks, process piping, pressure vessels, rotating machinery, and protective devices can be found in the GP 32 series.

2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

BP

Group Integrity Management Standard

GP 06-32	Guidance on Practice for Cathodic Protection of Onshore Pipelines.
GP 06-36	Guidance on Practice for Cathodic Protection Maintenance and Monitoring.
GP 43-00	Guidance on Practice for Pipeline Systems (Overview Document).
GP 43-01	Guidance on Practice for Principles of Onshore Pipeline Design and Project Execution.
GP 43-10	Guidance on Practice for Route Data Acquisition and Route Selection for Pipelines.
GP 43-17	Guidance on Practice for Pipeline Risk Management.
GP 43-29	Guidance on Practice for Land Acquisition.
GP 43-49	Guidance on Practice for Pipeline Integrity Management Systems.
GP 43-53	Guidance on Practice for Pipeline Intervention and Repair.
GP 43-55	Guidance on Practice for Management of a Pipeline Corridor.
RD 43-521	The Pipeline Defect Assessment Manual (PDAM), Final Report to the PDAM Joint Industry Project, Penspen Ltd.
RD 43-522	Pipeline Operators Forum (POF) 'Specifications and Requirements for Intelligent Pig Inspection of Pipelines'.

American Society of Mechanical Engineers (ASME)

ASME B31.8S	Managing System Integrity of Gas Pipelines.
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NACE International (NACE)

NACE RP0104	The Use of Coupons for Cathodic Protection Monitoring Applications.
NACE 35100	In-Line Non-destructive Inspection of Pipelines, Item No. 24211.

3. Terms and definitions

For the purposes of this GP, the following terms and definitions apply:

Feature

An indication identified by inspection that may affect the integrity of the pipeline system

Risk

The product of the likelihood of a specific threat or failure scenario occurring and the consequences

4. Abbreviations

For the purpose of this GP, the following symbols and abbreviations apply:

AUT	Automated Ultrasonic Technique
BoD	Basis of Design
DA	Direct Assessment
EA	Engineering Authority
ECDA	External Corrosion Direct Assessment
GIS	Geographical Information System
HCA	High Consequence Area
ICDA	Internal Corrosion Direct Assessment
NDT	Non-destructive testing
PIMS	Pipeline Integrity Management System
PTA	Pipeline Technical Authority
ROW	Right-of-Way
UT	Ultrasonic testing

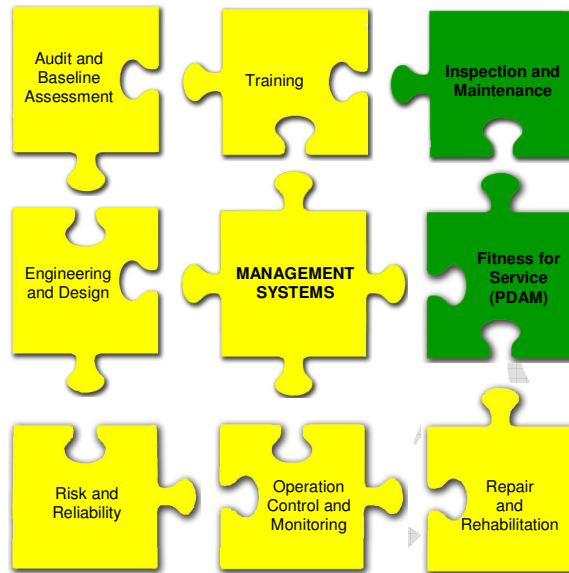
5. Inspection overview**5.1. General**

- a. This GP shall be read in conjunction with BP Group Policies and Standards and the full suite of Category 43 ETPs.
 1. The approach taken shall be consistent with the Group policy document for HSSE and the Group Integrity Management Standard.



2. Organisational responsibilities referred to in this document shall be in accordance with GP 43-49.
- b. Inspection and assessment of the condition of a pipeline are two key elements of the PIMS, as described in GP 43-49 and illustrated by Figure 1.

Figure 1 - Pipeline integrity management jigsaw



- c. If a pipeline is damaged in service, an integrity assessment shall be undertaken to determine the severity of the damage and the required remedial actions to ensure safe continued operation.
- d. Planning for periodic inspection and assessment of pipelines shall be undertaken early in the design phase of a project, e.g. Select phase, and not left to the operational phase.
- e. During project development, the risk and consequence of failure, the type of event and features that could lead to failure, and the available inspection techniques shall be identified.

These factors may directly influence the pipeline system design, e.g. the provision of pig traps, material selection, diameter changes, and the provision of additional protection features.

This cannot be achieved without discipline engineers and operations staff.

5.2. Inspection plan

- a. An inspection plan shall be established for each pipeline as part of the requirements of PIMS, covering all component parts of the pipeline system. See Figure 2 below.

Some components such as tanks, pressure relief systems, or pig traps may be included in Facilities Integrity Management System (FIMS). Whilst all components are captured somewhere it is important that during a review the pipeline is still reviewed as a complete system and that components are not lost between organisational groups.

- b. The inspection plan shall comply with local regulations and shall address each of the key risks identified in the risk management plan and the critical feature size that could lead to failure.
- c. The inspection plan shall focus upon the following key steps:



1. Inspection (measurement).
 2. Assessment of condition.
 3. Response (remedial action/ future monitoring or inspection).
 4. Review of inspection plan.
- d. Inspection scope and frequency shall be based upon the risk assessment which shall consider and evaluate the risks associated with the loss of pipeline integrity in terms of the following consequences:
1. Safety.
 2. Environment.
 3. BP business and reputation.
- e. The inspection plan shall adhere to local regulatory requirements.
- Guidance in this GP does not replace regulatory requirements affecting the pipeline.*
- f. The inspection plan shall be based on the structural design and critical loadings and feature sizes given in the pipeline BoD.
- If the BoD does not exist or is not adequate to provide sufficient guidance, the necessary design basis and limitations need to be established and specialist advice needs to be sought.*
- New design concepts or the introduction of new materials often introduce a new or different element of risk. If this occurs, an increased level of monitoring is recommended until an operational track record has been established.*
- g. The inspection plan shall include:
1. Objectives and scope of the inspection.
 2. Accuracy, reliability, and limits of the inspection techniques.
 3. Responsibilities and competencies.
 4. Reporting criteria.
 5. Frequency of inspection.
- h. The inspection plan shall be reviewed at appropriate intervals (this should normally be part of the annual PIMS review) with the PTA, noting changes to either the threats to or condition of the pipeline.
- Changes in either may indicate a need to change the type, scope, or frequency of inspection.*
- i. The competency of contractors and people employed to carry out the inspection shall be verified to ensure that they are suitable for each inspection type.
- j. Procedures shall be maintained to promptly assess and respond to the condition of each pipeline. These include:
1. Reporting of features that could affect pipeline integrity, ensuring reports are effectively communicated across the organisation.
 2. Appropriate actions to prevent harm to people, the environment, business, and reputation.
- k. A response plan shall be established for each pipeline which sets clear time limits from the discovery of a feature to taking remedial action.

In some countries regulations set clear time limits from time of discovery to action

