



Document No.	GP 43-04
Applicability	Group
Date	28 February 2006

Guidance on Practice for QA & QC for Pipeline Projects

GP 43-04

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 43-04.

This document may be superseded in the future (late 2006) by the issue of a Group Technical Integrity Management System Practice. Until that time, this GP is provided to give guidance on the application of Quality practices in undertaking BP pipeline projects.

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Introduction

This document provides BP Pipeline Projects with guidance on Quality Assurance/ Quality Control (QA/QC) and access to a repository of experience including lessons-learned reports. Any mandatory QA/QC guidance is also contained in this document. The purpose of this GP is to describe a management system that, if properly applied, ensures life cycle technical integrity and safety.

The repository of BP experience on QA/QC is contained in the Engineering Technical Practices (ETP) library archives and may be accessed by electronic link from this document.

Reference should also be made to the following documents:

- a. GP 43-00 Guidance on Practice for Pipeline Systems (Overview Document)
- b. GP 43-49 Pipeline Integrity Management Systems (PIMS)



1. Scope

QA and QC are fundamental to the process of delivering technical integrity management. They provide the checks, balances, and documented trail confirming that systems and procedures have been correctly implemented and that designs, materials, and construction are valid, meeting specification requirements.

- a. This GP is a guide to the application of QA and QC to pipeline projects and as a link to the repository of BP experience, lessons learnt, and relevant internal BP and external reference documents relating to pipeline QA and QC issues.
- b. In the absence of a BP Group-wide GP for QA/QC, this document includes specific guidance on QA/QC for pipeline projects. However, the document also covers generic aspects of Technical Integrity for Quality Assurance and Quality Control of projects.
- c. This document broadly provides guidance on the project management systems and organisation required to ensure that BP's technical integrity and quality requirements are met throughout the CVP stages of a pipeline project.
- d. To ensure long-term pipeline integrity and safety, specific aspects of this document are mandatory or strongly recommended for use in all future BP pipeline projects.
- e. This document does not specifically address activities used to ensure technical integrity and safety during pipeline operations, except if these are part of the project engineering, construction, commissioning, and handover processes. However, the application of project stage quality assurance and control requirements into the operations stage is important to ensure ongoing operational integrity.
- f. There is no intent to repeat or contradict other documents or standards available throughout BP on topics covered by this document, but this GP does make reference to related documents if applicable. Nevertheless, this document may provide additional emphasis or commentary, particularly if lessons have been learned on other projects.

Notwithstanding the above, the new BP Integrity Management Functional Standard, guidance and inherent safe design guideline, GP 48-50, requires the Group Major Accident Risk (MAR) process to be followed if major hazards are to be identified.

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.

2.1. Key processes

- a. Getting HSSE Right (gHSSer).
- b. Capital Value Process (CVP).
- c. Major Projects Common Process (MPCP).
- d. Integrity Management Functional Standard.
- e. Integrity Management Segment Implementation Guide.



2.2. References

BP

GP 32-10	Guidance on Practice for Inspection and Testing of New Equipment in Manufacture.
GP 32-20	Guidance on Practice for Site Inspection, Testing, and Pre-commissioning New Plant.
GIS 36-103	Guidance on Industry Standard for Positive Material Identification (PMI).
GP 43-17	Guidance on Practice for Risk Management.
GP 43-32	Guidance on Practice for Pipe Handling and Logistics.
GP 43-49	Guidance on Practice for Pipeline Integrity Management Systems.
GP 48-01	Guidance on Practice for HSSE Review of Projects.

International Organisation for Standardisation (ISO)

ISO 9000	Quality management systems – Fundamentals and vocabulary.
ISO 9001	Quality management systems – Requirements.

3. Terms and definitions

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

Certification

The action of determining, verifying and attesting in writing to the qualification of personnel, processes, procedures or items in accordance with applicable requirements and standards.

Criticality Rating

A formalised technique for assessing and measuring the importance of a piece of equipment or material, in regard to the effect that its failure would have on the system or scheme as a whole, and consequently the level of assurance and/or verification to be applied.

Integrity Management (IM)

The controlled application of major risk, process safety and engineering management combined with internationally recognised industry standards and BP developed practices.

Quality Assurance (QA)

Part of quality management focused on providing confidence that quality requirements will be fulfilled. The Quality Assurance process uses Integrity Management, provided by a document-based system of procedures in the attainment of technical integrity in design, procurement and construction. The procedures are used to set the base technical integrity requirements to be followed by the contractors. They set the risk based assurance and verifications to be performed by the BP project team during design, procurement and construction activities.

Quality Control (QC)

Part of quality management focused on verifying quality requirements. Contractors' certified Quality Assurance and Quality Control systems supplemented by BP's Integrity Management requirements are part of the Technical Integrity Assurance process. These are used as the primary process to assure and verify that the project integrity assurance system and integrity plan requirements have been met, the facility is safe, and meets the required performance standards at an acceptable cost. Quality Control on a project is part of the verification system used to provide confidence that the required technical integrity has been attained in the procurement and construction stages. It involves checking that



specified requirements have been met, often by using inspection and testing techniques, ensuring that the required technical integrity is achieved.

Note: Definitions for Quality Assurance and Quality Control are the same as those ISO 9000.

Technical Integrity

Facilities and equipment meet safety/specified requirements and are fit for the intended service with the goals of avoiding loss of containment, maintaining structural integrity and operational reliability throughout the full lifecycle of the facility and equipment in question.

4. Symbols and abbreviations

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

BU	Business unit
EA	Engineering authority
HAZOP	Hazardous operation
MOC	Management of change
PEP	Project execution plan
QMS	Quality management system
SOR	Statement of requirements

5. Overview of quality assurance and quality control

5.1. GP application

This GP shall be applied early in the project lifecycle (Appraise and Select), particularly during the preparation and review of tender and contract documents, emphasising the importance and understanding of BP's safety, technical integrity, and quality requirements.

5.2. Technical integrity and quality assurance

- a. IM and QA represent a pre-established, methodical, procedural approach as part of good project management, which shall be followed in all stages of the CVP and place the emphasis on prevention of non-conformance, rather than detection and cure.
- b. Contractors and suppliers shall be required to have certified quality management systems to International Quality Standards such as ISO 9001.

However, this by itself is not sufficient to ensure that the project defined quality levels will be met.

In the petroleum and allied industries, the consequences of failure of a pipeline system in service can be serious; and, it is unacceptable to permit a situation in which sub-standard work becomes apparent through in-service failure. A defective pipe in the ground or on the seabed can result in costly remedial work, ongoing maintenance issues and increased risk of failure.

- c. Project activities that affect the technical integrity of the pipeline system shall be subject to the procedures and controls that ensure that the specified levels of technical integrity are achieved, as defined by BP and the BU that owns the assets to be developed.



A Project Assurance System and integrity plan, as well as contractors' QA and QC procedures required for implementing these procedures in projects, are essential processes in meeting project technical integrity requirements, IM, and gHSSER expectations.

- d. The pipeline system, which is the project's task to create, shall be fit for its intended purpose. This means that the activities that contribute to its creation – design, procurement, construction, etc. – as well as the materials and equipment comprised in the facility shall be provided to pre-determined specifications.

5.3. Pipeline system integrity

- a. Design, procurement, and construction risks shall be identified and a process shall be put in place to ensure they are mitigated.

The risks are normally identified by engineering HAZIDS/HAZOPS, safety and environmental (phased PHSSERs) reviews, as well as risk assessment processes (e.g. QRAs), design development reviews, and supplier and contractor selection/competence and construction execution reviews.

- b. To support this, there are a number of key areas and special activities in the development of a pipeline system for which technical integrity requirements shall be satisfied. These include, but are not limited to:
 1. Pipeline concept selection and design.
 2. Material selection and procurement.
 3. Pipeline coating design and application.
 4. Pipeline welding processes.
 5. Onshore pipeline burial.
 6. Offshore pipeline installation.
 7. Corrosion control.
 8. Cathodic protection.
 9. Pressure relief systems.
 10. Non-destructive testing.
 11. Tracking and traceability of materials and equipment.
 12. Pipeline security.
 13. Control and telecommunications.
 14. As-built reporting.

5.4. Responsibility for technical integrity and quality assurance

Everyone in the project involved with the design, procurement, manufacture, construction, and commissioning is inherently accountable for the Technical Integrity of the facilities and the achievement of Quality to the specified requirements.

- a. Project designs and specifications shall clearly indicate what materials are required, what special manufacturing or construction techniques are necessary, the nature of the inspections and tests to be carried out, the stages at which these should be performed, and the certification records required.
- b. Procurement personnel shall ensure that specifications and requirements are clearly passed onto and understood by suppliers.

