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GP 10-01

Casing and Tubing Design

Group Practice

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Introduction

The introduction to this ETP mirrors section 13 of the revised DWOP.

All Casing and Tubing design activity shall conform to Engineering Technical Practice GP10-01 - Casing & Tubing Design

1 Design

- 1.1 All casing and tubing designs shall be addressed in a well basis of design document. If that document is field-wide, a separate document shall, when appropriate, stipulate where a specific well design deviates from the field-wide basis of design.
- 1.2 A casing and tubing design shall be performed for all wells and should incorporate foreseeable life-of-well requirements and abandonment. Where wells are to be produced, tested, stimulated, injected or modified, a design check shall be performed for the existing configuration, unless as part of the SPU assurance process a previous design is demonstrated to be adequate.

Design Standard

- 1.3 The requirements contained within the *BP Tubular Design Manual* (BPA-D-003) shall be applied for both the tubing and casing program basis of design. The basis of design will address parameters within which it is acceptable to plan further wells in a programme, campaign or area without further detailed design. When these parameters are exceeded, a detailed reassessment of the design is required.

Tools and Design Data

- 1.4 Casing and tubing design shall be performed using the BP approved casing design software and methods as identified in the *BP Tubular Design Manual*. Exceptions shall be subject to EPT review.
- 1.5 Every tubular component in the load path or forming part of the pressure envelope shall be traceable per API, ISO, and/or BP specifications and verified either by reference to the mill certificates or mechanical testing to have the expected mechanical performance. Every component shall also be in good condition, and all equipment should be suitable for expected service life.
- 1.6 Casing and tubing design software are safety critical.
- 1.7 Casing and tubing designs shall be subject to assurance review as a minimum shown in Table 1 in this ETP.
- 1.8 A minimum set of design loads, including setting depth, burst, collapse, tension and triaxial considerations for both the tube body and connection, is defined in the *BP Tubular Design Manual*. Designs governed by loads outside those listed in the *BP Tubular Design Manual* shall be subject to review as in Well Category 3 in Table 1.
 - 1. All casing and liners shall be designed to withstand reasonably foreseeable well control burst loadings. The starting point for well control burst loading shall be gas to surface from casing shoe, or lower open hole fracture pressure. Casing designs using lesser well control loadings not appearing in the *BP Tubular Design Manual* as acceptable alternatives shall be subject to review as per Well Category 2 in Table 1.
 - 2. Casing designs shall include definition of the well control scenarios they accommodate and their rationale based on subsurface information, local experience and operational well



control capabilities. Kick intensities for well design shall be based on appropriate and prudent application of pore pressure uncertainty as described in GP 10-15 Group Practice on Pore Pressure Prediction.

3. All production casing and liners shall be designed for burst, to withstand the maximum pressure resulting from a tubing leak at the wellhead applied over the packer fluid

Design factors

- 1.9 The minimum acceptable design factors for BP tubular design calculations are given in Table 2.

2 Procurement

Standard

- 2.1 Casing and tubing shall be manufactured, inspected and tested in accordance with the standards as outlined in the ETP 10-01

Qualifying Materials

Sour and/or Corrosive Service

- 2.2 The materials selection process for wells expected to contain H₂S shall comply with NACE MR0175/ISO 15156. Only seamless grades of tubulars are acceptable for casing and tubing which may be exposed to H₂S/sour environments as defined in NACE MR0175/ISO 15156.
- 2.3 The materials selection process for production tubulars expected to contain CO₂ and/or H₂S shall follow the requirements of BP EPT Guidance Note GN 036-13. In case of a conflict between this document and NACE MR0175/ISO 15156, the more onerous requirement shall govern.

Alteration of Specification Properties

- 2.4 Field welding of tubulars is permitted on API Spec 5L/ISO 3183 grade line pipe and API Spec 5CT/ISO 11960 Grade K55 tubulars, and shall conform to the guidelines laid out in API RP 5C1/ISO 10405. Welding operations on other grades of pipe will require specific qualifications and procedures per GP 18-01.

Well-site Inspection

- 2.5 All casing, tubing and handling tubulars shall be visually inspected and drift tested as close to the point of use as practical to identify handling damage to the pipe body and threaded connections that could present problems during installation and/or over the life of the well.

3 Operation

Loads

- 3.1 Operations during installation and well life shall not exceed the loads under which exposed tubulars have been designed. A revised design evaluation shall be completed, should such an occurrence be contemplated.

Setting Depths

Casing and liner setting depths shall be selected to provide a sufficient safety margin between formation fracture pressure and well control and/or casing cementing operations. Limitations on allowable well control operations shall be detailed in the design.



Foreword

This is the first issue of Engineering Technical Practice (ETP) BP 10-01 dealing with Casing & Tubing Design. This Group Practice (GP) replaces the relevant parts of the Drilling and Well Operations Policy BPA-D-01.

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