Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities

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ERRATA 1

NOTE: Annex A now begins with Section A.0 instead of Section A.1. All sections in Annex A have been renumbered to reflect this, and references to Annex A sections throughout the standard have been adjusted. In addition, figures and tables in Annex A are now numbered by section instead of sequentially.

Page 10, Section 3.2, add the following description for "PSS":

PSS platform safety system

Page 10, Section 3.2, add the following description for "UTH":

UTH umbilical termination hub

Page 16, Section 5.1.3, replace this section with the following:

5.1.3 Before a production facility safety system is placed in operation, procedures for testing and reporting should be established to ensure continued system integrity. Annex I may be used for this purpose.

Page 25, Section 6.2.2.7.6, replace the last sentence with the following:

See A.7.3.2 for additional guidance.

Page 27, Section 6.2.2.10.5, replace the next-to-last sentence with the following:

Recommended safe operating procedures are shown in A.6.4.

Page 36, Figure A.1.3, replace the "PHSL" symbol in the second from the top figure with the following:

PSHL

Page 39, Figure A.2.1, replace the "PHSL" symbol in all places with the following:

PSHL

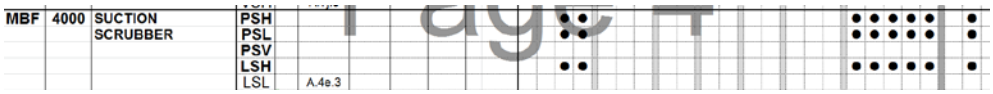
Page 45, Figure A.4.1, replace NOTE 3 with the following:

NOTE 3 If the vessel is subject to temperature lower than design a TSL shall be installed. See A.4.2.2.4.

Page 70, Figure A.8.1, replace the "OSH 4" symbol with the following:

OSH 2

Page 87, Figure B.2, replace the "Suction Scrubber" section with the following:



Page 99, Section E.2.1, replace the first bullet with the following:

— a prescriptive approach as outlined in this annex;

Page 125, Section I.3.3, in the second paragraph, replace the second sentence with the following:

See Annex D for more information on bypassing safety systems.

Page 126, Section I.3.7, replace the last sentence with the following:

See Annex D for more information on bypassing safety systems.

Page 126, Section I.3.8, in Item b), replace the second sentence with the following:

Because of the many possible equipment arrangements, detailed test procedure steps to deactivate a shutdown or control device or to take a component out of service during testing are not given; however, guidance on bypassing and out of service is provided in Annex D.

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Foreword

Other API documents for safety and antipollution systems used in offshore oil and gas production include the following:

— API Recommended Practice 14E, *Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems*;

— API Recommended Practice 14F, *Design, Installation, and Maintenance of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class 1, Division 1 and Division 2 Locations*;

— API Recommended Practice 14G, *Recommended Practice for Fire Prevention and Control on Fixed Open-type Offshore Production Platforms*;

— API Recommended Practice 14J, *Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities*;

— API Recommended Practice 17V, *Recommended Practice for Analysis, Design, Installation, and Testing of Safety Systems for Subsea Applications*;

— API Recommended Practice 75, *Recommended Practice for Development of a Safety and Environmental Management Program for Offshore Operations and Facilities.*

The verbal forms used to express the provisions in this document are as follows:

Shall: As used in a standard, “shall” denotes a minimum requirement in order to conform to the standard.

Should: As used in a standard, “should” denotes a recommendation or that which is advised but not required in order to conform to the standard.

May: As used in a standard, “may” denotes a course of action permissible within the limits of a standard.

Can: As used in a standard, “can” denotes a statement of possibility or capability.

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Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 1220 L Street, NW, Washington, DC 20005.

Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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Introduction

This document presents a systematization of proven practices for providing a safety system for offshore production facilities. Proper application of these practices, along with good design, hazard analysis, maintenance, and operation of the entire production facility, should provide an operationally safe facility.

The title of this document has been amended to include both fixed and floating facilities.

The Eighth Edition of this document is updated to include the changes in safety systems technology and provides additional guidance for facility safety systems as they have become larger, more complex, and moved into deeper water. Added requirements include extensive emphasis on the performing of hazards analysis due to increased flow rates, pressures, temperatures, and water depth.

This document has been developed in coordination with the first edition of API 17V, *Recommended Practice for Analysis, Design, Installation, and Testing of Safety Systems for Subsea Applications*.

Key changes to the main document include better alignment with API Standard 521, *Pressure-relieving and Depressuring Systems*, additional requirements for pumps and compressors greater than 1000 hp, and additional requirements to protect against backflow and settle-out pressures. Low-temperature hazards have been addressed for the first time, and the definitions section has been expanded.

All annexes have been defined as normative or informative and the analysis tables from the seventh edition have been removed. New annexes cover high-integrity pressure protection systems (HIPPS), logic solvers, bypassing, and remote operations. While HIPPS has been presented as an option for overpressure protection of multiple components, an HIPPS is used after thorough consideration of other alternatives. Caution should be applied when using HIPPS given the rigorous design, testing, and maintenance requirements for the system.

Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities

1 Scope

This document presents provisions for designing, installing, and testing both process safety and non-marine emergency support systems (ESSs) on an offshore production facility. The basic concepts of a facility safety system are discussed, and protection methods and requirements of the system are outlined.

For the purposes of this document, all process components from the surface wellhead and/or topside boarding valve are considered. For subsea equipment, Figure 1 provides a description between the scope of API 17V and this document.

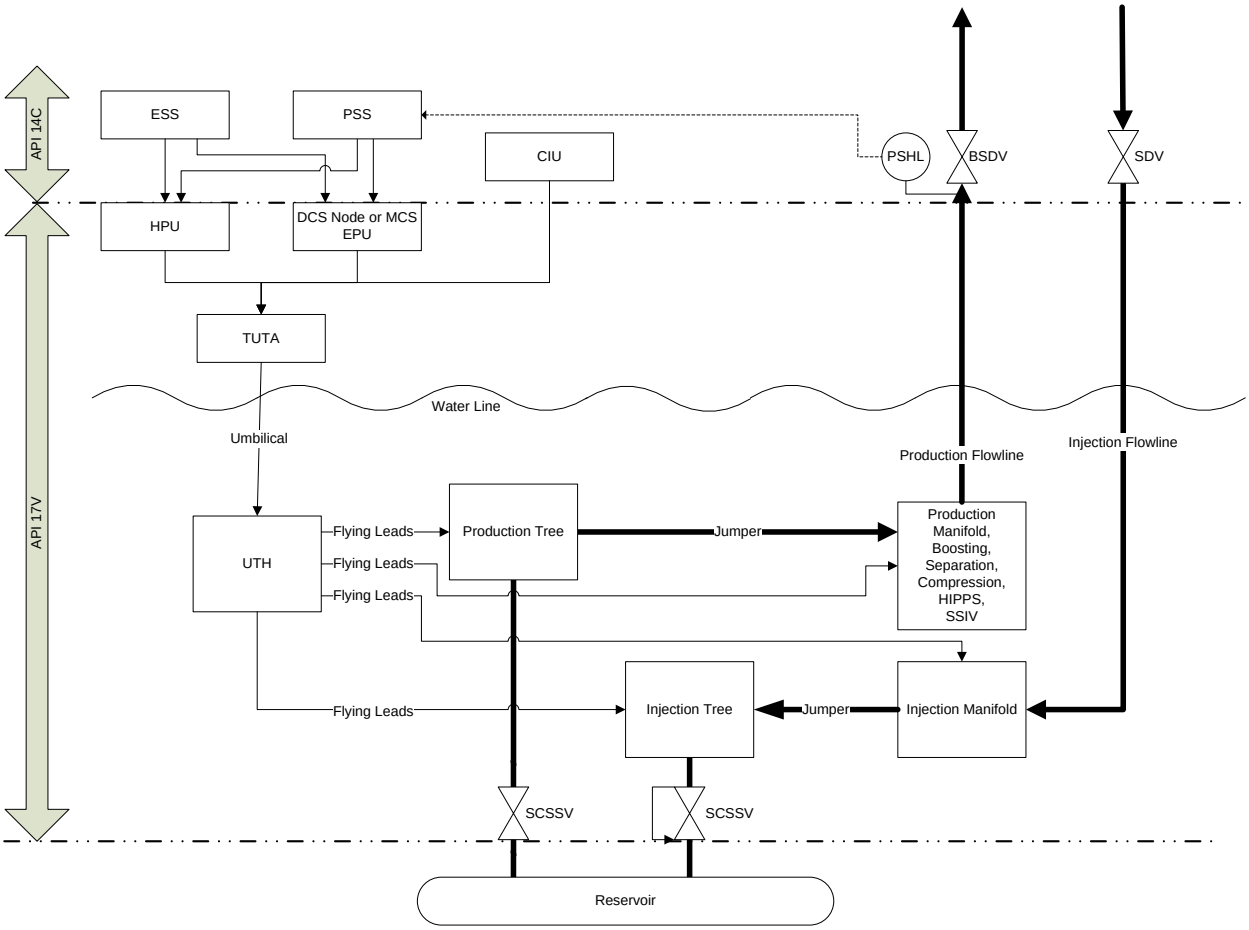

Figure 1—Scope of API 14C vs API 17V

API 17V is a companion document, which provides guidance for subsea safety systems. This document illustrates how system analysis methods can be used to determine safety requirements to protect common process components. Actual analyses of the principal components are developed in such a manner that the requirements are typically applicable whenever the component is used in the process. However, it is incumbent on the user to apply appropriate additional hazardous analysis methodologies to ensure that hazards are identified and mitigated.

This document also includes:

a) a method to document and verify process safety system functions [i.e. safety analysis function evaluation (SAFE chart)];