Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells

Exploration and Production Department

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FOREWORD

These recommended practices were prepared by the API Subcommittee on Blowout Prevention Equipment Systems. They represent a composite of the practices employed by various operating and drilling companies in drilling operations. In some cases, a reconciled composite of the various practices employed by these companies was utilized. This publication is under the jurisdiction of the American Petroleum Institute, Exploration & Production Department's Executive Committee on Drilling and Production Practices.

API Recommended Practice 53, First Edition, February 1976, superseded and replaced API Bulletin D13, *Installation and Use of Blowout Preventer Stacks and Accessory Equipment*, February 1966. The Second Edition was issued in May 1984.

Drilling operations are being conducted with full regard for personnel safety, public safety, and preservation of the environment in such diverse conditions as metropolitan sites, wilderness areas, ocean platforms, deep water sites, barren deserts, wildlife refuges, and arctic ice packs. Recommendations presented in this publication are based on this extensive and wide ranging industry experience.

The goal of these voluntary recommended practices is to assist the oil and gas industry in promoting personnel safety, public safety, integrity of the drilling equipment, and preservation of the environment for land and marine drilling operations. These recommended practices are published to facilitate the broad availability of proven, sound engineering and operating practices. This publication does not present all of the operating practices that can be employed to successfully install and operate blowout preventer systems in drilling operations. Practices set forth herein are considered acceptable for accomplishing the job as described; however, equivalent alternative installations and practices may be utilized to accomplish the same objectives. Individuals and organizations using these recommended practices are cautioned that operations must comply with requirements of federal, state, or local regulations. These requirements should be reviewed to determine whether violations may occur.

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Users of recommendations set forth herein are reminded that constantly developing technology and specialized or limited operations do not permit complete coverage of all operations and alternatives. Recommendations presented herein are not intended to inhibit developing technology and equipment improvements or improved operating procedures. These recommended practices are not intended to obviate the need for qualified engineering and operations analyses and sound judgments as to when and where these recommended practices should be utilized to fit a specific drilling application.

This publication includes use of the verbs *shall* and *should*, whichever is deemed the most applicable for the specific situation. For the purposes of this publication, the following definitions are applicable:

Shall: Indicates that the recommended practice(s) has universal applicability to that specific activity.

Should: Denotes a recommended practice(s) a) where a safe comparable alternative practice(s) is available; b) that may be impractical under certain circumstances; or c) that may be unnecessary under certain circumstances or applications.

Changes in the uses of these verbs are not to be effected without risk of changing the intent of recommendations set forth herein.

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Suggestions for revisions or additions are invited and should be submitted to the Director, Exploration and Production Department, American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005.

CONTENTS

Page

Page

Tables

Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells

1 Scope

1.1 PURPOSE

The purpose of these recommended practices is to provide information that can serve as a guide for installation and testing of blowout prevention equipment systems on land and marine drilling rigs (barge, platform, bottom-supported, and floating). Blowout prevention equipment systems are composed of all systems required to operate the blowout preventers (BOPs) under varying rig and well conditions. These systems are: blowout preventers (BOPs), choke and kill lines, choke manifold, hydraulic control system, marine riser, and auxiliary equipment. The primary functions of these systems are to confine well fluids to the wellbore, provide means to add fluid to the wellbore, and allow controlled volumes to be withdrawn from the wellbore. In addition, diverter systems are addressed in this Recommended Practice, though their primary purpose is to safely divert flow rather than to confine fluids to the wellbore. Refer to API Recommended Practice 64 for additional information on diverter systems. Marine risers are not dealt with in detail in this document. Refer to API Recommended Practice 16Q for additional information on marine drilling risers.

1.2 WELL CONTROL

Procedures and techniques for well control are not included in this publication since they are beyond the scope of equipment systems contained herein (refer to API Recommended Practice 59).

1.3 BOP INSTALLATIONS

In some instances, this publication contains a section pertaining to surface BOP installations followed by a section on subsea BOP installations. A delineation was made between *surface* and *subsea* equipment installations so these recommended practices would also have utility in floating drilling operations. Statements concerning surface equipment installations also generally apply to subsea equipment installations.

1.4 EQUIPMENT ARRANGEMENTS

Recommended equipment arrangements, as set forth in this publication, are adequate to meet specified well conditions. It is recognized that other arrangements may be equally effective and can be used in meeting well requirements and promoting safety and efficiency.

1.5 LOW TEMPERATURE OPERATIONS

Although operations are being conducted in areas of extremely low temperatures, a section specifically applicable to this service was not included since current practice generally results in protecting existing BOP equipment from this environment.

1.6 IN-THE-FIELD CONTROL SYSTEM ACCUMULATOR CAPACITY

It is important to distinguish between the standards for in-the-field control system accumulator capacity established here in Recommended Practice 53 and the design standards established in API Specification 16D.

API Specification 16D provides sizing guidelines for designers and manufacturers of control systems. In the factory, it is not possible to exactly simulate the volumetric demands of the control system piping, hoses, fittings, valves, BOPs, etc. On the rig, efficiency losses in the operation of fluid functions result from causes such as friction, hose expansion, control valve interflow as well as heat energy losses. Therefore, the establishment by the manufacturer of the design accumulator capacity provides a safety factor. This safety factor is a margin of additional fluid capacity which is not actually intended to be usable to operate well control functions on the rig.

For this reason, the control system design accumulator capacity formulas established in Specification 16D are different from the demonstrable capacity guidelines provided here in Recommended Practice 53.

The original control system manufacturer shall be consulted in the event that the field calculations or field testing should indicate insufficient capacity or in the event that the volumetric requirements of equipment being controlled are changed, such as by the modification or changeout of the BOP stack.

2 References

2.1 STANDARDS

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and users are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below: