Recommended Practice for Well Control Operations

API RECOMMENDED PRACTICE 59
SECOND EDITION, MAY 2006

REAFFIRMED, MAY 2023

American
Petroleum
Institute

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FOREWORD

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Drilling and well service unit (production well service, well workover, well completion, and plug and abandonment) 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, deepwater sites, barren deserts, wildlife refuges, and arctic ice packs. Recommendations presented in this publication are based on extensive and wide-ranging industry experience.

The goal of this voluntary recommended practice is to assist the oil and gas industry in promoting personnel and public safety, integrity of the drilling and well service equipment, and preservation of the environment for land and marine drilling and well service operations. This recommended practice is 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 well control systems on drilling and well service operations. Nor does this publication imply that all of the practices herein are applicable to all drilling and well service operations. Drilling and well service operations throughout the world vary widely and take place under a wide range of downhole and surface conditions. Practices at one operation will not necessarily be required at a similar operation due to different conditions. Practices set forth herein are considered acceptable for accomplishing the job as described; 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 national, state, or local regulations. These requirements should be reviewed to determine whether violations may occur.

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 operational procedures. These recommended practices are not intended to obviate the need for qualified engineering and operations analyses and sound judgements 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 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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Suggested revisions are invited and should be submitted to the Standards and Publications Department, API, 200 Massachusetts Avenue, NW, Washington, DC 20001, standards@api.org.

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Recommended Practice for Well Control Operations

1 Scope

1.1 PURPOSE

The purpose of these recommended practices is to provide information that can serve as a voluntary industry guide for safe well control operations. This publication is designed to serve as a direct field aid in well control and as a technical source for teaching well control principles. This publication establishes recommended operations to retain pressure control of the well under pre-kick conditions and recommended practices to be utilized during a kick. It serves as a companion to API RP 53, *Recommended Practice for Blowout Prevention Equipment Systems for Drilling Wells* and API RP 64 *Recommended Practice for Diverter Systems Equipment and Operations* (reader should check for the latest edition). RP 53 establishes recommended practices for the installation and testing of equipment for the anticipated well conditions and service and RP 64 establishes recommended practices for installation, testing, and operation of diverters systems and discusses the special circumstances of uncontrolled flow from shallow gas formations.

1.2 BOP INSTALLATIONS

The recommended practices are separated into two main systems:

1. Blowout preventers (BOPs) at the surface within reach and sight of the driller or well service unit operator, and
2. BOPs installed on the seafloor with relatively long choke and kill lines.

In this publication, sections have been prepared to establish practices and procedures pertaining to both surface BOP installations and subsea BOP installations. The delineation between surface BOP installations and subsea BOP installations is mainly on an exception basis, and the recommendations made for surface installations apply to subsea installations unless exceptions are stated. The recommended practices can apply to drilling, well service unit, and coiled tubing unit operations. The fundamentals of well flow and well control are the same.

1.3 OPERATIONS

This publication was developed to enhance well control by proper planning and execution and thus avoid a kick. The publication also deals with the eventuality that a well kick may occur and presents details for handling such a kick using basic control methods. Details of these basic control methods are presented for both surface and subsea BOP stack installations. Suggested considerations and modifications to the basic control methods, which may be dictated by special problems or well conditions, are also covered. Recommended well control worksheets for surface and subsea BOP installations are included in Appendix B. Instructions are included for completing and use of the well control worksheets. Recommended practices set forth in this publication are considered adequate to meet specified well conditions. It is recognized that there are alternate procedures that can be utilized in well control that may be equally as effective in meeting the well requirements and promoting safety and efficiency.

1.4 FURTHERING THE UNDERSTANDING OF WELL CONTROL

Details of well control technology and reasons for the recommended procedures are included in Section 4, "Principles of Well Control." Section 4 was prepared so it can be used as a technical base for instructing personnel in well control operations. Appendix A contains several special pressure and pressure gradient calculations and examples to further emphasize the techniques and calculations that can aid a well control supervisor in understanding well control operations.

1.5 DEEPWATER

The International Association of Drilling Contractors (IADC) has published guidelines for planning and drilling deepwater wells, IADC Deepwater Well Control Guidelines, 1998 Edition. The reader is referred to that document for more complete coverage of deepwater well control.

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:

API

Spec 6A	*Wellhead and Christmas Tree Equipment*
RP 5C1	*Recommended Practice for Care and Use of Casing and Tubing*
RP 5C7	*Recommended Practice for Coiled Tubing Operations in Oil and Gas Well Services*
RP 7G	*Drill Stem Design and Operating Limits*
RP 10B	*Recommended Practice for Testing Well Cements*
RP 13D	*Rheology and Hydraulics of Oil-Well Drilling Fluids*
RP 13B-1	*Standard Procedure for Field Testing Water-based Drilling Fluids*