Wellbore Plugging and Abandonment Practices

API BULLETIN E3
SECOND EDITION, APRIL 2018

AMERICAN PETROLEUM INSTITUTE

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Foreword

This document, prepared by the API Subcommittee on Well Cements (SC10) provides guidance on environmentally sound practices for wellbores drilled for oil and gas exploration and production (E&P) operations. Guidance is provided to accomplish the following:

— permanently abandon wells;

— place wells on inactive status (temporary abandonment).

Permanent abandonment is performed when there is no further utility for a wellbore by sealing the wellbore against fluid migration.

Inactive well practices may be performed when a wellbore has future utility, such as for enhanced oil recovery projects or conversion to a disposal or storage well. This permits the operator to hold the well in a condition that facilitates restoring its utility.

The purpose of this document is to address wellbore plugging and abandonment practices. The primary goals are protection of usable quality ground water, and isolation of hydrocarbon bearing, or water injection intervals. Topics discussed include, cementing practices, cement plug placement and the use of mechanical barriers. This document does not address regulatory requirements.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API Recommended Practice. Questions concerning the interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

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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1 Considerations for Plugged and Abandoned Wells

1.1 General

This document provides guidance for the design, placement, and verification of cement plugs in wells that are to be temporarily or permanently abandoned. Wells that are temporarily abandoned have intent to re-enter in the future. The placement of barriers vary depending on whether the well is to be temporarily or permanently abandoned.

The information in this document is general in nature. Wellbore plugging and abandonment practices will vary with regulation, well type, and purpose. Sound engineering and operational practices should be applied to each plugging operation. Plug lengths are not considered in this document. Local regulations must be considered in the design as they may dictate the length of cement to be placed below or above specific intervals, or both.

1.2 Well Construction and Abandonment Practices

This document assumes that generally accepted well construction practices were followed during the installation of the cemented casings.

As specified in API 65-2, properly designed casing strings cemented in place provide multiple barriers during well operations. An example abandoned wellbore can be seen in Figure 1.

Abandonment barriers installed during wellbore plugging and abandonment operations may include:

— plug set across any exposed casing/liner shoe;

— plugs set in open hole;

— cement or mechanical plugs, or both, set above perforated intervals in cased hole;

— plugs set at points where casing has been removed;

— plugs set across liner tops;

— plugs set above and below usable quality water;

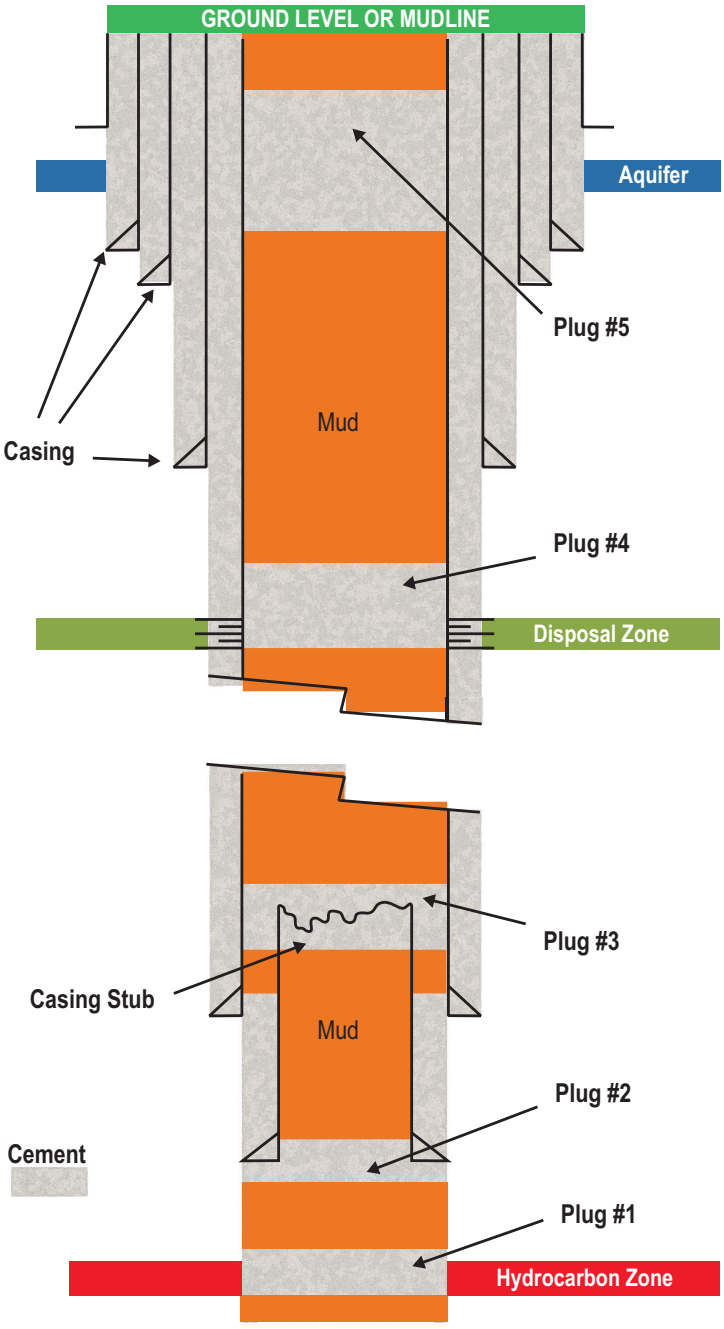
— plugs set above or below hydrocarbon bearing zones or other potential flow zones;

— plugs set at the surface or mudline.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Standard 65-2, *Isolating Potential Flow Zones During Well Construction*



NOTE 1 Plug #1 may cover all open hole length in several cases.
NOTE 2 Plug #3 is commonly called a casing stub plug.
NOTE 3 Plug #5 is commonly called surface plug.

Figure 1—Example Schematic of a Permanent Well Abandonment