Isolating Potential Flow Zones During Well Construction

Upstream Segment

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Foreword

This document was prepared with input from oil and gas operators, drilling contractors, service companies, consultants and regulators. It is based mainly on experiences in the United States outer continental shelf (OCS) and deepwater operating areas of the Gulf of Mexico, but may be of utility in other offshore and land operating areas. The content of this document is not all inclusive and not intended to alleviate the need for detailed information found in textbooks, manuals, technical papers, or other documents. The formulation, adoption, and publication of API standards are not intended to inhibit anyone from using any other practices.

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1 Scope

1.1 Overview

This document contains best practices for zone isolation in wells to prevent annular pressure and/or flow through c past pressure-containment barriers that are installed and verified during well construction. Barriers that seal w llb re and formation pressures or flows may include temporary pressure-containment barriers like hydr static head pressure during cement curing and permanent ones such as mechanical seals, shoe formations, and em nt. Other well construction (well design, drilling, leak-off tests, etc.) practices that may affect barrier sealing p rfo mance are mentioned along with methods to help ensure positive effects or to minimize any negative one . S e Section 2, *Definitions*, for this scope's applicable parameters including types of wells, well barriers, barrier e ements, etc.

1.2 Objectives

The objectives of this guideline are two-fold. The first is to help prevent and/or cont l flo s just prior to, during, and after primary cementing operations to install or "set" casing and liner pipe strin s in wells. Some of these flows have caused well control incidents that are very serious problems. They threaten the s fet of personnel, the environment, and the drilling rigs themselves. The second objective is to help prevent sustained casing pressure (SCP), also a serious industry problem.

Another publication, API 90, provides guidelines on managing annula casing pressure (ACP) including SCP, thermal casing pressure, and operator-imposed pressure. These guid lines include monitoring, diagnostic testing, establishing the maximum allowable wellhead operating pres ure (MAWOP), documenting annular casing pressure, and risk assessment methodologies. API 65 has been w itte to complement the objectives of API 90 and its recommended practices for pressure-containment barriers. Many of the definitions in Section 2 are aligned with those in API 90.

1.3 Background and Technology Review

A detailed background and technology re iew are in Annex A. Historical data, perspectives, studies, statistics, lessons learned, etc. are included. All th information has been written to help explain how some practices work, have become proven or invalidated or ha performance limitations placed upon their application.

1.4 Conditions of Applic bility

The guidance from this doc me t covers recommendations for pressure-containment barrier (cement, packers, etc.) design and installation and w ll construction practices that affect the zone isolation process to prevent or mitigate annular fluid flow o pres ure. Also covered are practices to identify relevant conditions including those predicted in:

1) a pre-spud ha ard assessment, and

2) th actu conditions experienced while the well is being drilled.

Th e p ctices may also help prevent loss of well control (LWC) incidents and minimize the occurrence of SCP d ring well construction and production.

Pre-spud information gathered from offset well(s) and/or from high resolution seismic surveys can be used to define the degree of flow potential (low, medium, high) for a particular drilling prospect. Any relevant information should be communicated to the appropriate service provider for incorporation into the design for a particular fluid (mud or cement) and for preparing engineering and operations procedures.