Drilling Ahead Safely with Lost Circulation in the Gulf of Mexico

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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

Lost circulation during drilling operations, in the form of both seepage and fracture losses, is a common occurrence in the Gulf of Mexico (GoM) and other Outer Continental Shelf (OCS) environments. Through extensive practical experience, operators and drilling contractors have learned that with proper information, planning and execution, lost circulation can be safely managed to allow well construction goals to be met. The methods used to repair or manage lost circulation are based on well location, geology, pore and fracture pressures, drilling depth, well design, hydraulics, mud properties, and available contingencies.

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1 Scope

This bulletin identifies items that should be considered to safely address lost circulation challenges when the equivalent circulating density (ECD) exceeds the fracture gradient. It addresses drilling margins and drilling ahead with mud losses, which are not addressed in API 65-2. It provides guidance when lost circulation is experienced with either surface or subsea stack operations (excluding diverter operations). These practices may apply to other Outer Continental Shelf (OCS) environments such as offshore California and Florida.

2 Terms and Definitions

For the purposes of this document, the following definitions apply.

2.1
abnormal pressure
Pressures greater than normal pressure, i.e. formation pressure that exceeds the gradient of a continuous column of water terminating at the surface or the seafloor.

NOTE Normal pressure in the GoM region is commonly considered to have gradients in the range of 8.65 ppg to 9.0 ppg. Abnormal pressure has a higher gradient.

2.2
annulus friction pressure
P_a
The steady state circulating pressure loss of a cuttings free fluid occurring within the drill string and casing and/or open-hole annulus.

NOTE The term does not include pressure effects associated with cuttings loading.

2.3
application for permit to modify/revised permit to drill
APM/RPD
This document requests changes to a well permit.

NOTE This regulatory submittal document can require a risk assessment and/or procedures for the changes to be approved.

2.4
ballooning (wellbore breathing)
The event in which fluid is lost to the formation while circulating and flows back into the wellbore when circulation is stopped.

NOTE 1 During ballooning, mud returns will be at a steady or decreasing rate over time.

NOTE 2 Increasing return rates are not expected with ballooning and would be an indication of the influx of formation fluids.

NOTE 3 Return volumes are expected to be limited to the volume lost to the formation.

2.5
depleted zone
A geologic interval having a pore pressure lower than the original reservoir pressure caused by production from that interval.

NOTE The reduction in pore pressure can create a lower fracture pressure within the interval.