BIT DULL GRADING RECOMMENDED PRACTICE

CONSOLIDATED DOCUMENT

0.1 EDITION, MAY 2022

1 PURPOSE AND SCOPE

1.1 GUIDELINES

The purpose of this document is to provide recommended practices and an improved framework for bit dull grading. This is to promote and maintain the quality and consistency of bit dull grading processes to enhance the drilling process.

The items addressed in this recommended practice are for

- Bottom Hole Assemblies
- Drill Bits
- Data Management

The recommended practice also provides a set of cases studies and supporting documents.

1.2 TRAINING

The purpose of the document is not only to provide an improved dull grading schema but also provide more insight in the underlying processes leading to damage. It is envisioned that more insight will lead to more precise and consistent dull grading processes in the industry.

1.3 NORMATIVE LANGUAGE

It is important to recognize that this document is a recommended practice. As a result, this document does not have any requirements and does not include any "shall," "must" and "will" statements.

These recommendations use the following normative language:

Should / should not:
As used in a standard, "should" denotes a recommendation or that which is advised but not required in order to conform to the standard

May / need not:
"may" denotes a course of action permissible within the limits of a standard

Can / cannot:
"can" denotes a statement of possibility or capability

Refer to the following for more discussion of the use of normative language:

- http://www.iso.org/iso/how-to-write-standards.pdf, page 4

- http://www.iso.org/iso/foreword
- http://www.iec.ch/members_experts/refdocs/iec/isoiec-dir2%7Bed6.0%7Den.pdf

2 RELEVANT STANDARDS

Spec 7-1/ISO 10424-1:2004
Specification for Rotary Drill Stem Elements (includes Addendum 1 dated March 2007, Addendum 2 dated August 2009, Addendum 3 dated April 2011, Addendum 4 dated February 2019, and Errata 1 dated July 2020)

API RP 7G
16th Edition, August 1998 - Recommended Practice for Drill Stem Design and Operating Limits

3 INTRODUCTION

The current process as defined in SPE 16145 *("Application of the New IADC Dull Grading System for Fixed Cutter Bits", 1987)* has served the industry well and allowed for significant advancements in drill bit technology, design, and selection techniques. However, recent improvements in scanning and computing technologies have provided an opportunity to further refine this process to take advantage of modern tools.

This recommended practice provides the framework of a detailed dull grading process that is driven by accurate observation of damage on every cutter of a fixed cutter drill bit. This process can be performed manually by trained experts. However, it is expected to be significantly streamlined by the coming widespread adoption of automated drill bit scanning systems.

This recommended practice provides an improved format that could be used whenever individual cutter data is available. When individual cutter data is not available the legacy system may still be used. As of note some minor refinements to the legacy system are introduced in later sections of this document.

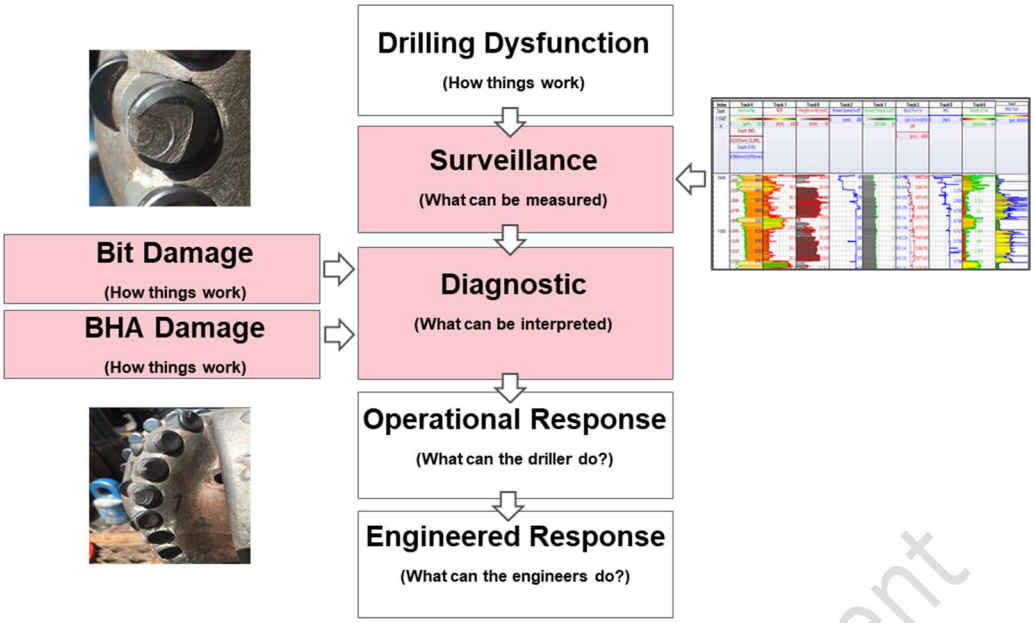

FIGURE 1 DULL GRADING PROCESS