

# Standard Form for Hardcopy Presentation of Downhole Well Log Data

API RECOMMENDED PRACTICE 31A  
FIRST EDITION, AUGUST 1997

REAFFIRMED, JANUARY 2012



AMERICAN PETROLEUM INSTITUTE



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**Exploration and Production Department**

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## FOREWORD

Development of Recommended Practice 31A was initiated by the API Executive Committee on Drilling and Production Practices. This document was prepared by the API Subcommittee on Standard Format for Electromagnetic Logs.

This document was derived in part from API Recommended Practice 31, which was originally adopted in 1947, and revised in 1967. Recommended Practice 31 is being superseded by API Recommended Practice 31A. API Recommended Practice 31A provides significant enhancements to both the content and format of the standard log heading and data presentation sections of the original API Recommended Practice 31. The revised heading will allow more complete and convenient reporting of data that should accompany each log in order to facilitate its correct interpretation and use. The revised format has been designed to apply not only to electric logs, but also to all wireline-logging measurements commonly obtained in either cased or open holes. Additionally, the revised format applies to downhole measurements obtained while drilling. Together these changes will allow greater ease of merging information from multiple logging runs, or from multiple tools in a single run.

The recommendations within API Recommended Practice 31A have been developed to apply to a wide range of commonly obtained logging measurements. Additional recommendations regarding content and format of data presentation may be contained in other API documents relating to specific classes of logging measurements. Finally, all of the information content recommended within API Recommended Practice 31A for hardcopy presentation is recommended also for inclusion within digital presentation of the same well log data. The recommended digital formats to be used are provided in API Recommended Practice 66.

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to assure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any federal, state, or municipal regulation with which this publication may conflict.

Suggested revisions are invited and should be submitted to the director of the Exploration and Production Department, American Petroleum Institute, 1220 L Street, N.W., Washington, D.C. 20005.

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# Standard Form for Hardcopy Presentation of Downhole Well Log Data

## 1 Scope

The variety, use, and value of log recordings of subsurface properties have been greatly increased and expanded since the last revision of Recommended Practice 31. A wide diversity of log measurements (from both open and cased hole) are routinely being combined to interpret the original status of newly drilled wells and to evaluate performance and potential throughout each well's life. Standardization of the log form and data presentation will allow the user to conveniently combine log data from various devices and dates. Recognizing the wide variability in the tools covered by these recommendations, this document attempts to preserve flexibility wherever possible. The format selected allows for presentation of data that can be measured as a series of values at specified well depths. Consequently, this document can be easily applied to most logging measurements, and will serve as a reference document to technology-specific documents. This document makes no recommendations concerning the standard log record (refer to Section 4) for measurements that are data series at individual depths (for example, pressure transients, video images, sonic traces, and so forth). To the extent that recommended practices for the presentation of such data are appropriate, they should be included within separate Recommended Practices for the technologies involved.

In addition to the recommendations concerning the format for presentation of log data, this document provides several enhancements to the standard log heading. These changes are designed to provide the user with a more complete set of information in consistent locations on all logs. Due to the increasing use of tool calibration and data processing while logging, recommendations are provided concerning documentation of equipment history and processing software. One should identify tool-specific information in other appropriate recommended publications.

The recommended additions to the content of the support information included with hardcopy presentations of well log data, as described in the following, should also be included with digital recordings of the same well logs. The recommended digital formats to be used are provided in API Recommended Practice 66.

The recommendations contained within API Recommended Practice 31A provide some flexibility regarding the dimensions of the actual print field used in the hardcopy presentation of well log data. This flexibility will accommodate the use of commonly available printers and paper sizes as optional alternatives to the 6.25-inch by 9.25-inch fanfold paper on which log data has been traditionally printed. Example figures conforming to this document and printed at the dimensions required for 8.5-inch by 11-inch paper are provided. The changes made to accommodate this flexibility in

paper and printer selection will in no way alter the actual scaling of the log data. Log data curves will precisely "overlay," regardless of the choice of paper or print field dimensions. Any hardcopy presentation of log data that meets all of the information content and format specifications described in the text of this document shall be considered to be in conformance with it.

## 2 References

Unless otherwise specified, the most recent editions or revisions of the following standards, codes, and specifications shall, to the extent specified herein, form a part of this standard.

### API

- RP 13B-1 *Recommended Practice for Standard Procedure for Field Testing Water-Based Drilling Fluids*
- RP 13B-2 *Recommended Practice for Standard Procedure for Field Testing Oil-Based Drilling Fluids*
- RP 13G *Recommended Practice for Standard Procedure for Laboratory Testing Drilling Fluids*
- RP 66 *Exploration and Production Data Digital Interchange*

## 3 Standard Heading

### 3.1 INTRODUCTION

A recommended standard heading has been developed for all downhole well log data, which provides space for information pertinent to the interpretation of these logs. This information should be recorded on field copies as well as on final prints because considerable log interpretation is made from field copies. The logging company is normally responsible for recording complete standard-heading data. However, the logging company depends upon the operator for much of these data. Thus the operator shares the responsibility for providing complete and accurate data.

### 3.2 GENERAL INFORMATION

The recommended standard log heading has four parts consisting of a cover panel, followed consecutively by panels for well logging operations, borehole fluid properties, and a wellbore diagram. Generally, the length of each panel is between 8 inches and 8.25 inches, and the width is between 5.5 inches and 6 inches. Acceptable alternative formats are identified for specific panels in the detailed descriptions provided in the following.

### 3.3 COVER PANEL

#### 3.3.1 Format

Two optional formats (portrait and landscape, see Figures 1 and 2 respectively) are provided for the Cover Panel. Both formats contain space for identical information. The well operator has the responsibility to select the preferred option. Each panel includes six fields as follows:

#### 3.3.2 Service Company

The field at the top of the cover panel is for the logging company's name, company logo, and log name.

#### 3.3.3 Well Identification

The well identification field includes the unique API well number, well name, operator, producing field, county/parish, state/province, and country. If the well is not drilled in a producing field, the term *wildcat* may be placed in the space for field name.

#### 3.3.4 Location

The location field contains space for a description of the well's surface location. Data may include grid coordinates, latitude and longitude, section, township, and range or other detailed survey description.

#### 3.3.5 Elevation

The elevation fields design affords accurate vertical reference for both drilling and logging operations. The permanent depth datum and its elevation, as designated by the well operator, should be recorded so that removal of the rig or other equipment will not result in loss of datum. The permanent datum should be ground level, mean sea level, or a specific point on permanent wellhead equipment. Where possible all logs and driller's measurements should relate to the top of the rotary table's kelly drive bushing. When there is no kelly bushing, the drilling floor elevation should be used for reference and the space on the heading for kelly bushing elevation should be entered with *N/A*.

#### 3.3.6 Other Services

The other services field is provided for the logging engineer to list logging services performed in the well that are not included on this presentation. Each service should be identified by a unique mnemonic, as well as a brief English description (for example, DLL = dual laterolog).

#### 3.3.7 Intervals, Dates, and Scales

The intervals, dates, and scales field is for information about the logged interval, print type, acquisition dates, depth

units, depth scale ratios, and depth scaling. The log interval should identify the shallowest and the deepest logged depths presented. Acquisition dates refer to the beginning and conclusion of the acquisition of presented data.

Depth scale ratio is a unitless ratio of depth on the log to depth in the borehole. For example, a ratio of 1:240 is the same as that commonly referred to in the United States as a 5-inch scale where 5 inches of log equal 100 feet of borehole. If more than one depth scale is presented, each should be specified.

### 3.4 WELL LOGGING OPERATIONS PANEL

**3.4.1** The *Well Logging Operations Panel* is placed immediately after the Cover Panel. This panel is a table for compilation of certain data about each log presented. Each column in the table relates to a single logging tool, including its auxiliary devices. Additional panels can be added as needed (see Figure 3). Definitions and instructions for the data entries contained within this panel are provided in the following paragraphs.

**3.4.2** The *log* is an individual logging tool run in the borehole. Combination tool runs should be reported by individual tools. Auxiliary logs such as spontaneous potential (SP), gamma ray, and caliper should not be included unless they are run separately.

**3.4.3** The *date*: record the date when the logging job begins.

**3.4.4** The *logging job* refers to the group of logs run from the time the service company begins the logging operation until the time the service company is released from the wellsite. Logging jobs are numbered consecutively. In most downhole measurements obtained during drilling operations, the logging job number will be 1.

**3.4.5** The *logging suite* refers to the group of logs run in the same borehole environment during a single logging job. The borehole environment is controlled by the borehole diameter and fluid composition and may change during the logging operation. Possible reasons to change the logging suite number include (a) drilling ahead (after bit size change), (b) changing mud properties, and/or (c) performing clean-out trips. Suite numbers increase consecutively throughout the process of drilling and evaluating a well. The suite number should be 1 only for the first logging suite of the first logging job.

For downhole measurements obtained while drilling, the logging suite number should change each time there is a significant change in bit diameter or mud properties.

The following is a logging-suite example: During the first logging job, a clean-out trip with drill pipe was made. The logs obtained before the cleanout trip are included in Suite 1. Logs run after the trip are included in suite 2. The logging job

performed after the final portion of hole was drilled is logging job 2. If no changes in mud properties occurred during this logging job and no clean out trips were made, all logs from logging job 2 would be in suite 3.

**3.4.6** *A logging run:* a set of measurements by an individual tool, during which the formation properties are considered to be static. Runs are numbered consecutively for each tool (but not each tool string).

The following is a logging run example: A well is to be drilled with two intermediate logging jobs, the first requiring a dual induction tool, and the second requiring a dual induction/porosity combination tool. The final logging job requires a dual laterolog logging tool. The two intermediate logging jobs would include logging run 1 and logging run 2 for the dual induction tool even though the dual induction tool was run by itself on logging job 1 and was run as part of a combination tool on logging job 2. Logging job 3 would include logging run 1 for the dual laterolog tool because this would be the first instance where that tool was used.

**3.4.7** *The Number of repeats:* enter the number of repeat measurement passes made within each logging run. Repeat passes are considered to be identical within the precision of the logging measurement.

**3.4.8** *TD—driller:* record the depth at the bottom of the hole according to the driller's measurements at the time the well is logged. If the well has been plugged back, one should record plugback depth and indicate by the abbreviation *P.B.*

**3.4.9** *TD—logger:* record the depth at the bottom of the hole as measured by the logging company.

**3.4.10** *Deepest reading:* record and mark on the log the deepest depth at which a formation measurement is recorded. The measurement at this depth may not be valid (see 3.4.11).

**3.4.11** *Deepest valid data:* record and mark on the log the deepest depth at which the log provides a valid formation measurement.

**3.4.12** *Shallowest reading:* record and mark on the log the shallowest depth at which a formation measurement is recorded. The measurement at this depth may not be valid (see 3.4.13).

**3.4.13** *Shallowest valid data:* record and mark on the log the shallowest depth where the log provides a valid formation measurement.

**3.4.14** *Deepest casing—driller:* record casing size and depth where the deepest casing string has been set according to the driller's measurements in the following manner: 12.25 inches at 9203 feet.

**3.4.15** *Deepest casing—logger:* record casing size and depth where the deepest casing shoe is detected by the logging tool.

**3.4.16** *Bit size:* record the size of the bit used to drill the deepest portion of the logged hole. The logged portion of the hole may have been drilled with bits of different sizes. This information should be incorporated in the wellbore diagram.

**3.4.17** *Logging speed:* indicate the logging direction (up/down), record the average speed at which the tool is run while data is being acquired.

**3.4.18** *Date/time on bottom:* record the date and time of day when the logging tool reaches its maximum depth.

**3.4.19** *Logging unit number:* record the number of the logging company's wellsite unit that performs the logging job.

**3.4.20** *Operations base:* record the name of the logging company's base of wellsite operations.

**3.4.21** *Service order number:* record the logging company's service order number.

**3.4.22** *Recorded by:* record the name of the logging company engineer primarily responsible for the wellsite logging job.

**3.4.23** *Witnessed by:* record the name of the operating company representative primarily responsible for witnessing the logging job.

## 3.5 SPECIAL NOTIFICATIONS AND REMARKS PANEL

### 3.5.1 Location and Content

The Special Notification and Remarks Panel is placed immediately after the Well-Logging Operations Panel and is formatted to provide space for both generalized statements as described in the following paragraphs and specific comments relating to the log data or its presentation. An example of this panel is provided in Figure 4. The dimensions of this panel may be adjusted as necessary to accommodate the amount of information contained.

### 3.5.2 Service Company Disclaimer

If the logging company wishes to include a statement concerning liability or policy, the statement may be placed in this field on the Special Notifications and Remarks Panel.

### 3.5.3 Conformance with API Recommended Practice

When the hardcopy presentation of downhole well log data conforms to this recommended practice, a logging company may print this fact in a field adjacent to the service company disclaimer. The statement, "This hardcopy presentation of downhole well log data conforms to API Recommended Practice 31A," may be used.