

COGCC WELL LOG SUBMITTAL POLICY

December 23, 2013; Revised November 23, 2015

The submittal of well logs to the COGCC is required by Rule 308A.b, which states:

Copies of all logs run, open-hole and cased-hole, electric, mechanical, mud, or other, shall be submitted with the Form 5 as follows: a digital image file (PDF, TIFF, PDS, or other format approved by the Director) of every log run shall be attached to the form; a digital data file (LAS, DLIS, or other format approved by the Director) shall also be attached for every log run, with the exception of mud logs and cement bond logs. A paper copy may be submitted in lieu of the digital image file.

This policy is intended to meet the requirements of the Rule and to improve the digital access and availability of electronic geophysical well logs. With the implementation of the revised rule effective September 30, 2014, all logs should be filed in electronic formats and paper copies are no longer required. The matrix below shows the acceptable formats.

Log Submittal Policy Electronic Formats

Type of Log	Digital Image File Format	Digital Data Format
Standard Electric Log with Curve Data (including LWD/MWD & cased hole logs)	PDF, TIFF, PDS or other approved format	LAS
Image Log with Array Data (including LWD/MWD & cased hole logs)	PDF, TIFF, PDS or other approved format	DLIS
Mud Logs	PDF, TIFF, PDS or other approved format	LAS (Only if it has the only GR data for any portion of the wellbore)
Cement Bond Log	PDF, TIFF, PDS or other approved format	LAS (Only if it has the only GR data for any portion of the wellbore)

This policy is also intended to clarify and update the log submittal requirements to reflect the logging technology currently being utilized to evaluate downhole geologic formations.

I. Digital Image File of a Log Requirement (Replaces the Paper Log Submittal)

Rule 308A.b no longer requires paper log submittal. The digital image file shall be a PDF (Portable Document Format) file, a TIFF (Tagged Image File Format) file, or another format approved by the Director. TIFF files shall be vendor-generated and not less than 100 dots per inch (DPI).

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The digital image file of a log shall be submitted via upload within an electronically submitted Drilling Completion Report, Form 5 or within an electronically submitted Sundry Notice, Form 4.

II. Digital Log Data Formats

Rule 308A.b requires digital log data submittal and approves the LAS (log ASCII) digital log format and the DLIS (Digital Log Interchange Standard) format for digital log data submittal.

III. Digital Log Data Requirements

Rule 308A.b requires digital log data submittal for all logs run. Some well logging tools measure and record a single value per log parameter per depth, generating a simple log curve. However, other well logging tools measure multiple values per log parameter per depth or per time, recording an array of data. The data array may include azimuth readings or a waveform and may be used to generate an image of the formations in the wellbore. The digital log data submitted for a log that recorded an array of data must include the entire data array.

Digital log data is required for a cement bond log and a mud log *only* if that log has the only Gamma Ray data for any portion of the wellbore. If other logs provide Gamma Ray data for the entire wellbore, digital log data is not required for a cement bond log or a mud log.

Digital log data shall be submitted via upload within an electronically submitted Drilling Completion Report, Form 5 or within an electronically submitted Sundry Notice, Form 4.

IV. Log Version Requirements

Many of the logging service companies offer interpretive analysis with some of the imaging logs. These interpretive services are integrated into the final log display that is provided to the operator. Some interpretive features on the logs can be considered proprietary and are not required to be submitted to the COGCC. The un-interpreted version that is environmentally corrected for depth, azimuth, rotation, et cetera, but not minimized by resampling, is required by the COGCC.

If the final log includes interpretive analysis, both the digital log data and the digital image file shall be of the complete, composite environmentally corrected un-interpreted version.

If the final log does not include any interpretive analysis, both the digital log data and the digital image file shall be of the complete, composite final version.

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V. Measured-While-Drilling/Logging-While-Drilling Logs Requirements

Rule 308A.b requires the submittal of all logs run. This requirement includes the logs obtained utilizing logging-while-drilling (LWD) or measured-while-drilling (MWD) technology. Both the digital image file and the digital log data of all LWD/MWD logs shall be submitted.

VI. Imaging Logs Requirements

Recent improvements in the technology of imaging logging tools have greatly improved the quality of the imaging logs. This has increased their value in evaluating unconventional reservoirs and, therefore has increased the competitive advantage these logs provide to an operator. In addition, the cost of running and interpreting these logs is significant. In recognition of these facts, the COGCC will consider imaging logs to have been timely filed per Rule 308A provided they are submitted within 1 year of the latest to occur of the following:

- Date well reached total depth ("TD")
- Date production casing was run
- Date well was production tested

This does *not* apply to acoustic imaging cement bond logs; *all* cement bond logs shall be submitted within 60 days of rig release on the Form 5, Drilling Completion Report. The digital image file and the digital log data for imaging logs shall be submitted via upload within an electronically submitted Sundry Notice, Form 4.

VII. Reporting

All logs run prior to the submittal of the Drilling Completion Report, Form 5 shall be reported on the Form 5, including Imaging Logs that will not be submitted until up to 1 year later. When reporting a logging-while-drilling (LWD) or a measured-while-drilling (MWD) log, the log shall be clearly identified as LWD or MWD and by the type of logging tool (i.e. gamma-ray, resistivity, density, etc.). Logs run after the Form 5 has been submitted shall be reported and submitted via upload within an electronically submitted Sundry Notice, Form 4.