TABLE 1 TO § 3174.15—VIOLATIONS SUBJECT TO AN IMMEDIATE ASSESSMENT—Continued

Violations subject to an immediate assessment	
Violation:	Assessment amount per violation:
2. Failure to notify the AO within 72 hours, as required by § 3174.7(e) of this subpart, of any FMP LACT system failure or equipment malfunction resulting in use of an unapproved alternate method of measurement	1,000
3. Missing or nonfunctioning FMP CMS components as required by § 3174.9 of this subpart	1,000
4. Failure to meet the proving frequency requirements for an FMP, detailed in § 3174.11 of this subpart	1,000
5. Failure to obtain a written approval, as required by § 3174.13 of this subpart, before using any oil measurement method other than tank gauging, LACT system, or CMS at a FMP	1,000

Subpart 3175—Measurement of Gas

SOURCE: 81 FR 81609, Nov. 17, 2016, unless otherwise noted.

§ 3175.10 Definitions and acronyms.

(a) As used in this subpart, the term:

AGA Report No. (followed by a number) means a standard prescribed by the American Gas Association, with the number referring to the specific standard.

Area ratio means the smallest unrestricted area at the primary device divided by the cross-sectional area of the meter tube. For example, the area ratio (A_r) of an orifice plate is the area of the orifice bore (A_d) divided by the area of the meter tube (A_D). For an orifice plate with a bore diameter (d) of 1.000 inches in a meter tube with an inside diameter (D) of 2.000 inches the area ratio is 0.25 and is calculated as follows:

$$A_d = \frac{\pi d^2}{4} = \frac{\pi \cdot 1.000^2}{4} = 0.7854 in^2 \quad A_D = \frac{\pi D^2}{4} = \frac{\pi \cdot 2.000^2}{4} = 3.1416 in^2$$

$$A_r = \frac{A_d}{A_D} = \frac{0.7854 in^2}{3.1416 in^2} = 0.25$$

As-found means the reading of a mechanical or electronic transducer when compared to a certified test device, prior to making any adjustments to the transducer.

As-left means the reading of a mechanical or electronic transducer when compared to a certified test device, after making adjustments to the transducer, but prior to returning the transducer to service.

Atmospheric pressure means the pressure exerted by the weight of the atmosphere at a specific location.

Beta ratio means the measured diameter of the orifice bore divided by the measured inside diameter of the meter tube. This is also referred to as a diameter ratio.

Bias means a systematic shift in the mean value of a set of measurements away from the true value of what is being measured.

British thermal unit (Btu) means the amount of heat needed to raise the temperature of one pound of water by 1 °F.

Component-type electronic gas measurement system means an electronic gas measurement system comprising transducers and a flow computer, each identified by a separate make and model, from which performance specifications are obtained.

Configuration log means a list of all fixed or user-programmable parameters used by the flow computer that could

affect the calculation or verification of flow rate, volume, or heating value.

Discharge coefficient means an empirically derived correction factor that is applied to the theoretical differential flow equation in order to calculate a flow rate that is within stated uncertainty limits.

Effective date of a spot or composite gas sample means the first day on which the relative density and heating value determined from the sample are used in calculating the volume and quality on which royalty is based.

Electronic gas measurement (EGM) means all of the hardware and software necessary to convert the static pressure, differential pressure, and flowing temperature developed as part of a primary device, to a quantity, rate, or quality measurement that is used to determine Federal royalty. For orifice meters, this includes the differential-pressure transducer, static-pressure transducer, flowing-temperature transducer, on-line gas chromatograph (if used), flow computer, display, memory, and any internal or external processes used to edit and present the data or values measured.

Element range means the difference between the minimum and maximum value that the element (differential-pressure bellows, static-pressure element, and temperature element) of a mechanical recorder is designed to measure.

Event log means an electronic record of all exceptions and changes to the flow parameters contained within the configuration log that occur and have an impact on a quantity transaction record.

GPA (followed by a number) means a standard prescribed by the Gas Processors Association, with the number referring to the specific standard.

Heating value means the gross heat energy released by the complete combustion of one standard cubic foot of gas at 14.73 pounds per square inch absolute (psia) and 60 °F.

Heating value variability means the deviation of previous heating values over a given time period from the average heating value over that same time period, calculated at a 95 percent confidence level. Unless otherwise approved by the BLM, variability is determined with the following equation:

$$V_{95\%} = 100 \times \frac{\sigma_{HV} \times 2.776}{\overline{HV}}$$

Where:

$V_{95\%}$ = heating value variability, %

σ_{HV} = standard deviation of the previous 5 heating values

2.776 = the ''student-t'' function for a probability of 0.05 and 4 degrees of freedom (degree of freedom is the number of samples minus 1)

$\overline{HV}$= the average heating value over the time period used to determine the standard deviation

High-volume facility measurement point or high-volume FMP means any FMP that measures more than 200 Mcf/day, but less than or equal to 1,000 Mcf/day over the averaging period.

Hydrocarbon dew point means the temperature at which hydrocarbon liquids begin to form within a gas mixture. For the purpose of this regulation, the hydrocarbon dew point is the flowing temperature of the gas measured at the FMP, unless otherwise approved by the AO.

Integration means a process by which the lines on a circular chart (differential pressure, static pressure, and flowing temperature) used in conjunction with a mechanical chart recorder are re-traced or interpreted in order to determine the volume that is represented by the area under the lines. An integration statement documents the values determined from the integration.

Live input variable means a datum that is automatically obtained in real time by an EGM system.

Low-volume facility measurement point or low-volume FMP means any FMP that measures more than 35 Mcf/day, but less than or equal to 200 Mcf/day, over the averaging period.

Lower calibrated limit means the minimum engineering value for which a transducer was calibrated by certified equipment, either in the factory or in the field.

Mean means the sum of all the values in a data set divided by the number of values in the data set.

Mole percent means the number of molecules of a particular type that are present in a gas mixture divided by the total number of molecules in the gas mixture, expressed as a percentage.

Normal flowing point means the differential pressure, static pressure, and flowing temperature at which an FMP normally operates when gas is flowing through it.

Primary device means the volume-measurement equipment installed in a pipeline that creates a measureable and predictable pressure drop in response to the flow rate of fluid through the pipeline. It includes the pressure-drop device, device holder, pressure taps, required lengths of pipe upstream and downstream of the pressure-drop device, and any flow conditioners that may be used to establish a fully developed symmetrical flow profile.

Qualified test facility means a facility with currently certified measurement systems for mass, length, time, temperature, and pressure traceable to the NIST primary standards or applicable international standards approved by the BLM.

Quantity transaction record (QTR) means a report generated by an EGM system that summarizes the daily and hourly volumes calculated by the flow computer and the average or totals of the dynamic data that is used in the calculation of volume.

Reynolds number means the ratio of the inertial forces to the viscous forces of the fluid flow, and is defined as:

$$R_e = \frac{V\rho D}{\mu}$$

Where:

R_e = the Reynolds number
V = velocity
ρ = fluid density
D = inside meter tube diameter
μ = fluid viscosity

Redundancy verification means a process of verifying the accuracy of an EGM system by comparing the readings of two sets of transducers placed on the same primary device.

Secondary device means the differential-pressure, static-pressure, and temperature transducers in an EGM system, or a mechanical recorder, including the differential pressure, static pressure, and temperature elements, and the clock, pens, pen linkages, and circular chart.

Self-contained EGM system means an EGM system in which the transducers and flow computer are identified by a single make and model number from which the performance specifications for the transducers and flow computer are obtained. Any change to the make or model numbers of either a transducer or a flow computer within a self-contained EGM system changes the system to a component-type EGM system.

Senior fitting means a type of orifice plate holder that allows the orifice plate to be removed, inspected, and replaced without isolating and depressurizing the meter tube.

Standard cubic foot (scf) means a cubic foot of gas at 14.73 psia and 60 °F.

Standard deviation means a measure of the variation in a distribution, and is equal to the square root of the arithmetic mean of the squares of the deviations of each value in the distribution from the arithmetic mean of the distribution.

Tertiary device means, for EGM systems, the flow computer and associated memory, calculation, and display functions.

Threshold of significance means the maximum difference between two data sets (a and b) that can be attributed to uncertainty effects. The threshold of significance is determined as follows:

$$T_s = \sqrt{U_a^2 + U_b^2}$$

Where:

T_s = Threshold of significance, in percent

U_a = Uncertainty (95 percent confidence) of data set a, in percent

U_b = Uncertainty (95 percent confidence) of data set b, in percent

Transducer means an electronic device that converts a physical property such as pressure, temperature, or electrical resistance into an electrical output signal that varies proportionally with the magnitude of the physical property. Typical output signals are in the form of electrical potential (volts), current (milliamps), or digital pressure or temperature readings. The term transducer includes devices commonly referred to as transmitters.

Turndown means a reduction of the measurement range of a transducer in order to improve measurement accuracy at the lower end of its scale. It is typically expressed as the ratio of the upper range limit to the upper calibrated limit.

Type test means a test on a representative number of a specific make, model, and range of a device to determine its performance over a range of operating conditions.

Uncertainty means the range of error that could occur between a measured value and the true value being measured, calculated at a 95 percent confidence level.

Upper calibrated limit means the maximum engineering value for which a transducer was calibrated by certified equipment, either in the factory or in the field.

Upper range limit (URL) means the maximum value that a transducer is designed to measure.

Verification means the process of determining the amount of error in a differential pressure, static pressure, or temperature transducer or element by comparing the readings of the transducer or element with the readings from a certified test device with known accuracy.

Very-low-volume facility measurement point or very-low-volume FMP means any FMP that measures 35 Mcf/day or less over the averaging period.

Very-high-volume facility measurement point or very-high-volume FMP means any FMP that measures more than 1,000 Mcf/day over the averaging period.

(b) As used in this subpart the following additional acronyms carry the meaning prescribed:

GARVS means the BLM's Gas Analysis Reporting and Verification System.

GC means gas chromatograph.

GPA means the Gas Processors Association.

Mcf means 1,000 standard cubic feet.

psia means pounds per square inch—absolute.

psig means pounds per square inch—gauge.

§ 3175.20 General requirements.

Measurement of all gas at an FMP must comply with the standards prescribed in this subpart, except as otherwise approved under § 3170.6 of this part.

§ 3175.30 Incorporation by reference.

(a) Certain material identified in this section is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. Operators must comply with all incorporated standards and material as they are listed in this section. To enforce any edition other than that specified in this section, the BLM must publish a rule in the FEDERAL REGISTER and the material must be reasonably available to the public. All approved material is available for inspection at the Bureau of Land Management, Division of Fluid Minerals, 20 M Street SE., Washington, DC 20003, 202–912–7162; and at all BLM offices with jurisdiction over oil and gas activities; and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to *http://*

www.archives.gov/federal__register/code__of__federal__regulations/ibr__locations.html.

(b) American Gas Association (AGA), 400 North Capitol Street NW., Suite 450, Washington, DC 20001; telephone 202–824–7000.

(1) AGA Report No. 3, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids, Second Edition, September, 1985 (''AGA Report No. 3 (1985)''), IBR approved for §§ 3175.61(a) and (b), 3175.80(k), and 3175.94(a).

(2) AGA Transmission Measurement Committee Report No. 8, Compressibility Factors of Natural Gas and Other Related Hydrocarbon Gases; Second Edition, November 1992 (''AGA Report No. 8''), IBR approved for §§ 3175.103(a) and 3175.120(d).

(c) American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005; telephone 202–682–8000. API also offers free, read-only access to some of the material at *http://publications.api.org*.

(1) API Manual of Petroleum Measurement Standards (MPMS) Chapter 14—Natural Gas Fluids Measurement, Section 1, Collecting and Handling of Natural Gas Samples for Custody Transfer; Seventh Edition, May 2016 (''API 14.1''), IBR approved for §§ 3175.112(b) and (c), 3175.113(c), and 3175.114(b).

(2) API MPMS, Chapter 14, Section 3, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids—Concentric, Square-edged Orifice Meters, Part 1, General Equations and Uncertainty Guidelines; Fourth Edition, September 2012; Errata, July 2013 (''API 14.3.1''), IBR approved for § 3175.31(a) and Table 1 to § 3175.80.

(3) API MPMS Chapter 14, Section 3, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids—Concentric, Square-edged Orifice Meters, Part 2, Specification and Installation Requirements; Fifth Edition, March 2016 (''API 14.3.2''), IBR approved for §§ 3175.46(b) and (c), 3175.61(a), 3175.80(c) through (g) and (i) through (l), and Table 1 to § 3175.80.

(4) API MPMS Chapter 14, Section 3, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids—Concentric, Square-edged Orifice Meters, Part 3, Natural Gas Applications; Fourth Edition, November 2013 (''API 14.3.3''), IBR approved for §§ 3175.94(a) and 3175.103(a).

(5) API MPMS Chapter 14, Natural Gas Fluids Measurement, Section 3, Concentric, Square-Edged Orifice Meters, Part 3, Natural Gas Applications, Third Edition, August, 1992 (''API 14.3.3 (1992)''), IBR approved for § 3175.61(b).

(6) API MPMS, Chapter 14, Section 5, Calculation of Gross Heating Value, Relative Density, Compressibility and Theoretical Hydrocarbon Liquid Content for Natural Gas Mixtures for Custody Transfer; Third Edition, January 2009; Reaffirmed February 2014 (''API 14.5''), IBR approved for §§ 3175.120(c) and 3175.125(a).

(7) API MPMS Chapter 21, Section 1, Flow Measurement Using Electronic Metering Systems—Electronic Gas Measurement; Second Edition, February 2013 (''API 21.1''), IBR approved for Table 1 to § 3175.100, §§ 3175.101(e), 3175.102(a) and (c) through (e), 3175.103(b) and (c), and 3175.104(a) through (d).

(8) API MPMS Chapter 22—Testing Protocol, Section 2, Differential Pressure Flow Measurement Devices; First Edition, August 2005; Reaffirmed August 2012 (''API 22.2''), IBR approved for § 3175.47(b) through (d).

(d) Gas Processors Association (GPA), 6526 E. 60th Street, Tulsa, OK 74145; telephone 918–493–3872.

(1) GPA Standard 2166–05, Obtaining Natural Gas Samples for Analysis by Gas Chromatography Revised 2005 (''GPA 2166–05''), IBR approved for §§ 3175.113(c) and (d), 3175.114(a), and 3175.117(a).

(2) GPA Standard 2261–13, Analysis for Natural Gas and Similar Gaseous Mixtures by Gas Chromatography; Revised 2013 (''GPA 2261–13''), IBR approved for § 3175.118(a) and (c).

(3) GPA Standard 2198–03, Selection, Preparation, Validation, Care and Storage of Natural Gas and Natural Gas Liquids Reference Standard Blends; Revised 2003 (''GPA 2198–03''), IBR approved for § 3175.118(c).

(4) GPA Standard 2286–14, Method for the Extended Analysis of Natural Gas and Similar Gaseous Mixtures by Temperature Program Gas Chromatography; Revised 2014 (''GPA 2286–14''), IBR approved for § 3175.118(e).

(e) Pipeline Research Council International (PRCI), 3141 Fairview Park Dr., Suite 525, Falls Church, VA 22042; telephone 703–205–1600.

(1) PRCI Contract–NX–19, Manual for the Determination of Supercompressibility Factors for Natural Gas; December 1962 (''PRCI NX 19''), IBR approved for § 3175.61(b).

(2) [Reserved]

NOTE TO PARAGRAPHS (b) THROUGH (e): You may also be able to purchase these standards from the following resellers: Techstreet, 3916 Ranchero Drive, Ann Arbor, MI 48108; telephone 734–780–8000; *www.techstreet.com/api/apigate.html*; IHS Inc., 321 Inverness Drive South, Englewood, CO 80112; 303–790–0600; *www.ihs.com*; SAI Global, 610 Winters Ave., Paramus, NJ 07652; telephone 201–986–1131; *http://infostore.saiglobal.com/store/*.

§ 3175.31 Specific performance requirements.

(a) *Flow rate measurement uncertainty levels.* (1) For high-volume FMPs, the measuring equipment must achieve an overall flow rate measurement uncertainty within ±3 percent.

(2) For very-high-volume FMPs, the measuring equipment must achieve an overall flow rate measurement uncertainty within ±2 percent.

(3) The determination of uncertainty is based on the values of flowing parameters (*e.g.*, differential pressure, static pressure, and flowing temperature for differential meters or velocity, mass flow rate, or volumetric flow rate for linear meters) determined as follows, listed in order of priority:

(i) The average flowing parameters listed on the most recent daily QTR, if available to the BLM at the time of uncertainty determination; or

(ii) The average flowing parameters from the previous day, as required under § 3175.101(b)(4)(i) through (iii) (for differential meters).

(4) The uncertainty must be calculated under API 14.3.1, Section 12 (incorporated by reference, see § 3175.30) or other methods approved by the AO.

(b) *Heating value uncertainty levels.* (1) For high-volume FMPs, the measuring equipment must achieve an annual average heating value uncertainty within ±2 percent.

(2) For very-high-volume FMPs, the measuring equipment must achieve an annual average heating value uncertainty within ±1 percent.

(3) Unless otherwise approved by the AO, the average annual heating value uncertainty must be determined as follows:

$$U_{\overline{HV}} = 0.951 \times V_{95\%} \sqrt{\frac{1}{N}}$$

Where:

$U_{\overline{HV}}$ = average annual heating value uncertainty

$V_{95\%}$ = heating value variability

N = the number of samples taken per year (N = 1, 2, 4, 6, 12, or 26)

(c) *Bias.* For low-volume, high-volume, and very-high-volume FMPs, the measuring equipment used for either flow rate or heating value determination must achieve measurement without statistically significant bias.

(d) *Verifiability.* An operator may not use measurement equipment for which the accuracy and validity of any input,

factor, or equation used by the measuring equipment to determine quantity, rate, or heating value are not independently verifiable by the BLM. Verifiability includes the ability to independently recalculate the volume, rate, and heating value based on source records and field observations.

§ 3175.40 Measurement equipment approved by standard or make and model.

The measurement equipment described in §§ 3175.41 through 3175.49 is approved for use at FMPs under the conditions and circumstances stated in those sections, provided it meets or exceeds the minimum standards prescribed in this subpart.

§ 3175.41 Flange-tapped orifice plates.

Flange-tapped orifice plates that are constructed, installed, operated, and maintained in accordance with the standards in § 3175.80 are approved for use.

§ 3175.42 Chart recorders.

Chart recorders used in conjunction with approved differential-type meters that are installed, operated, and maintained in accordance with the standards in § 3175.90 are approved for use for low-volume and very-low-volume FMPs only, and are not approved for high-volume or very-high-volume FMPs.

§ 3175.43 Transducers.

(a) A transducer of a specific make, model, and URL is approved for use in conjunction with differential meters for high-volume or very-high-volume FMPs if it meets the following requirements:

(1) It has been type-tested under § 3175.130;

(2) The documentation required in § 3175.134 has been submitted to the PMT; and

(3) It has been approved by the BLM and placed on the list of type-tested equipment maintained at *www/blm.gov*.

(b) A transducer of a specific make, model, and URL, in use at an FMP before January 17, 2017, is approved for continued use if:

(1) Data supporting the published performance specification of the transducer are submitted to the PMT in lieu of the documentation required in paragraph (a)(2) of this section; and

(2) It has been approved by the BLM and placed on the list of type-tested equipment maintained at *www.blm.gov*.

(c) All transducers are approved for use at very-low- and low-volume FMPs.

§ 3175.44 Flow-computer software.

(a) A flow computer of a particular make and model, and equipped with a particular software version, is approved for use at high- and very-high-volume FMPs if the flow computer and software version meet the following requirements:

(1) The documentation required in § 3175.144 has been submitted to the PMT;

(2) The PMT has determined that the flow computer and software version passed the type-testing required in § 3175.140, except as provided in paragraph (b) of this section; and

(3) The BLM has approved the flow computer and software version and has placed them on the list of approved equipment maintained at *www.blm.gov*.

(b) *Software versions (high- and very-high-volume FMPs).* (1) Software revisions that affect or have the potential to affect determination of flow rate, determination of volume, determination of heating value, or data or calculations used to verify flow rate, volume, or heating value must be type-tested under § 3175.140.

(2) Software revisions that do not affect or have the potential to affect the determination of flow rate, determination of volume, determination of heating value, or data and calculations used to verify flow rate, volume, or heating value are not required to be type-tested, however, the operator must provide the BLM with a list of these software versions and a brief description of what changes were made from the previous version. (The software manufacturer may provide such information instead of the operator.)

(c) *Software versions (low- and very-low-volume FMPs).* All software versions are approved for use at low- and very-low-volume FMPs, unless otherwise required by the BLM.

§ 3175.45 Gas chromatographs.

GCs that meet the standards in §§ 3175.117 and 3175.118 for determining heating value and relative density are approved for use.

§ 3175.46 Isolating flow conditioners.

The BLM will list on *www.blm.gov* the make, model, and size of isolating flow conditioner that is approved for use in conjunction with a flange-tapped orifice plate, so long as the isolating flow conditioner is installed, operated, and maintained in compliance with the requirements of this section. Approval of a particular make and model is obtained as prescribed in this section.

(a) All testing required under this section must be performed at a qualified test facility not affiliated with the flow-conditioner manufacturer.

(b) The operator or manufacturer must test the flow conditioner under API 14.3.2, Annex D (incorporated by reference, see § 3175.30) and submit all test data to the BLM.

(c) The PMT will review the test data to ensure that the device meets the requirements of API 14.3.2, Annex D (incorporated by reference, see § 3175.30) and make a recommendation to the BLM to either approve use of the device, disapprove use of the device, or approve it with conditions for its use.

(d) If approved, the BLM will add the approved make and model, and any applicable conditions of use, to the list maintained at *www.blm.gov*.

§ 3175.47 Differential primary devices other than flange-tapped orifice plates.

A make, model, and size of differential primary device listed at *www.blm.gov* is approved for use if it is installed, operated, and maintained in compliance with any applicable conditions of use identified on *www.blm.gov* for that device. Approval of a particular make and model is obtained as follows:

(a) All testing required under this section must be performed at a qualified test facility not affiliated with the primary device manufacturer.

(b) The primary device must be tested under API 22.2 (incorporated by reference, see § 3175.30).

(c) The operator must submit to the BLM all test data required under API 22.2 (incorporated by reference, see § 3175.30). (The manufacturer of the primary device may submit such information instead of the operator.)

(d) The PMT will review the test data to ensure that the primary device meets the requirements of API 22.2 (incorporated by reference, see § 3175.30) and § 3175.31(c) and (d) and make a recommendation to the BLM to either approve use of the device, disapprove use of the device, or approve its use with conditions.

(e) If the primary device is approved by the BLM, the BLM will add the approved make and model, and any applicable conditions of use, to the list maintained at *www.blm.gov*.

§ 3175.48 Linear measurement devices.

A make, model, and size of linear measurement device listed at *www.blm.gov* is approved for use if it is installed, operated, and maintained in compliance with any conditions of use identified on *www.blm.gov* for that device. Approval of a particular make and model is obtained as follows:

(a) The linear measurement device must be tested at a qualified test facility not affiliated with the linear-measurement-device manufacturer;

(b) The operator or manufacturer must submit to the BLM all test data required by the PMT;

(c) The PMT will review the test data to ensure that the linear measurement device meets the requirements of § 3175.31(c) and (d) and make a recommendation to the BLM to either approve use of the device, disapprove use of the device, or approve its use with conditions; and

(d) If the linear measurement device is approved, the BLM will add the approved make and model, and any applicable conditions of use, to the list maintained at *www.blm.gov*.

§ 3175.49 Accounting systems.

An accounting system with a name and version listed at *www.blm.gov* is approved for use in reporting logs and records to the BLM. The approval is specific to those makes and models of flow computers for which testing demonstrates compatibility. Approval for a

particular name and version of accounting system used with a particular make and model of flow computer is obtained as follows:

(a) For daily QTRs (see § 3175.104(a)), an operator or vendor must submit daily QTRs to the BLM both from the accounting system and directly from the flow computer for at least 6 consecutive monthly reporting periods;

(b) For hourly QTRs (see § 3175.104(a)), an operator must submit hourly QTRs to the BLM both from the accounting system and directly from the flow computer for at least 15 consecutive daily reporting periods. (A vendor may submit such information on behalf of an operator);

(c) For configuration logs (see § 3175.104(b)), an operator must submit at least 10 configuration logs to the BLM taken at random times covering a span of at least 6 months both from the accounting system and directly from the flow computer. (A vendor may submit such information on behalf of an operator);

(d) For event logs (see § 3175.104(c)), an operator must submit an event log to the BLM containing at least 50 events both from the accounting system and directly from the flow computer. (A vendor may submit such information on behalf of an operator);

(e) For alarm logs (see § 3175.104(d)), an operator must submit an alarm log to the BLM containing at least 50 alarm conditions both from the accounting system and directly from the flow computer (a vendor may submit such information on behalf of an operator);

(f) The BLM may require additional tests and records that may be necessary to determine that the software meets the requirements of § 3175.104(a);

(g) The records retrieved directly from the flow computer in paragraphs (a) through (d) of this section must be unedited;

(h) The records retrieved from the accounting system in paragraphs (a) through (d) must include both edited and unedited versions; and

(i) The BLM will approve the accounting system name and version for use with the make and model of flow computer used for comparison, and add the system name and version to the list of approved systems maintained at *www.blm.gov* if:

(1) The BLM compares the records retrieved directly from the flow computer with the unedited records from the accounting system and there are no significant discrepancies; and

(2) The BLM compares the records retrieved directly from the flow computer with the edited records from the accounting system and all changes are clearly indicated, the reason for each change is indicated or is available upon request, and the edited version is clearly distinguishable from the unedited version.

§ 3175.60 Timeframes for compliance.

(a) *New FMPs.* (1) Except as allowed in paragraphs (a)(2) through (4) of this section, the measuring procedures and equipment installed at any FMP on or after January 17, 2017 must comply with all of the requirements of this subpart upon installation.

(2) The gas analysis reporting requirements of § 3175.120(e) and (f) will begin on January 17, 2019.

(3) High- and very-high-volume FMPs must comply with the sampling frequency requirements of § 3175.115(b) starting on January 17, 2019. Between January 17, 2017 and January 17, 2019, the initial sampling frequencies required at high- and very-high-volume FMPs are those listed in Table 1 to § 3175.110.

(4) Equipment approvals required in §§ 3175.43, 3175.44, and 3175.46 through 3175.49 will be required after January 17, 2019.

(b) *Existing FMPs.* (1) Except as allowed in § 3175.61, measuring procedures and equipment at any FMP in place before January 17, 2017 must comply with the requirements of this subpart within the timeframes specified in this paragraph (b).

(2) High- and very-high-volume FMPs must comply with:

(i) All of the requirements of this subpart except as specified in paragraphs (b)(2)(ii) and (iii) of this section by January 17, 2018;

(ii) The gas analysis reporting requirements of § 3175.120(e) and (f) starting on January 17, 2019; and

(iii) Equipment approvals required in §§ 3175.43, 3175.44, and 3175.46 through 3175.49 starting on January 17, 2019.

(3) Low-volume FMPs must comply with all of the requirements of this subpart by January 17, 2019.

(4) Very-low-volume FMPs must comply with all of the requirements of this subpart by January 17, 2020.

(c) During the phase-in timeframes in paragraph (b) of this section, measuring procedures and equipment in place before January 17, 2017 must comply with the requirements in place prior to the issuance of this rule, including Onshore Oil and Gas Order No. 5, Measurement of Gas, and applicable NTLs, COAs, and written orders.

(d) Onshore Oil and Gas Order No. 5, Measurement of Gas, statewide NTLs, variance approvals, and written orders that establish requirements or standards related to gas measurement and that are in effect on January 17, 2017 are rescinded as of:

(1) January 17, 2018 for high-volume and very-high-volume FMPs;

(2) January 17, 2019 for low-volume FMPs; and

(3) January 17, 2020 for very-low-volume FMPs.

§ 3175.61 Grandfathering.

(a) *Meter tubes.* Meter tubes installed at high- and low-volume FMPs before January 17, 2017 are exempt from the meter tube requirements of API 14.3.2, Subsection 6.2 (incorporated by reference, see § 3175.30), and § 3175.80(f) and (k). For high-volume FMPs, the BLM will add an uncertainty of ±0.25 percent to the discharge coefficient uncertainty when determining overall meter uncertainty under § 3175.31(a), unless the PMT reviews, and the BLM approves, data showing otherwise. Meter tubes grandfathered under this section must still meet the following requirements:

(1) Orifice plate eccentricity must comply with AGA Report No. 3 (1985), Section 4.2.4 (incorporated by reference, see § 3175.30).

(2) Meter tube construction and condition must comply with AGA Report No. 3 (1985), Section 4.3.4 (incorporated by reference, see § 3175.30).

(3) *Meter tube lengths.* (i) Meter tube lengths must comply with AGA Report No. 3 (1985), Section 4.4 (dimensions ''A'' and ''A''' from Figures 4–8) (incorporated by reference, see § 3175.30).

(ii) If the upstream meter tube contains a 19-tube bundle flow straightener or isolating flow conditioner, the installation must comply with § 3175.80(g);

(b) *EGM software.* (1) EGM software installed at very-low-volume FMPs before January 17, 2017 is exempt from the requirements in § 3175.103(a)(1). However, flow-rate calculations must still be calculated in accordance with AGA Report No. 3 (1985), Section 6, or API 14.3.3 (1992), and supercompressibility calculations must still be calculated in accordance with PRCI NX 19 (all incorporated by reference, see § 3175.30).

(2) EGM software installed at low-volume FMPs before January 17, 2017 is exempt from the requirements at § 3175.103(a)(1)(i) if the differential-pressure to static-pressure ratio, based on the monthly average differential pressure and static pressure, is less than the value of ''x_i'' shown in API 14.3.3 (1992), Annex G, Table G.1 (incorporated by reference, see § 3175.30). However, flow-rate calculations must still be calculated in accordance with API 14.3.3 (1992) (incorporated by reference, see § 3175.30).

§ 3175.70 Measurement location.

(a) *Commingling and allocation.* Gas produced from a lease, unit PA, or CA may not be commingled with production from other leases, unit PAs, CAs, or non-Federal properties before the point of royalty measurement, unless prior approval is obtained under 43 CFR subpart 3173.

(b) *Off-lease measurement.* Gas must be measured on the lease, unit, or CA unless approval for off-lease measurement is obtained under 43 CFR subpart 3173.

§ 3175.80 Flange-tapped orifice plates (primary devices).

Except as stated in this section, as prescribed in Table 1 to this section, or grandfathered under § 3175.61, the standards and requirements in this section apply to all flange-tapped orifice plates (Note: The following table lists the standards in this subpart and the

API standards that the operator must follow to install and maintain flange-tapped orifice plates. A requirement applies when a column is marked with an ''x'' or a number.).

Table 1 to § 3175.80: Standards for Flange-Tapped Orifice Plates

Standards for Flange-Tapped Orifice Plates					
Subject	Reference (API standards incorporated by reference, see § 3175.30)	VL	L	H	VH
Fluid conditions	API 14.3.1, Subsection 4.1	n/a	x	x	x
Orifice plate construction and condition	API 14.3.2, Section 4	x	x	x	x
Orifice plate eccentricity and perpendicularity[2]	API 14.3.2, Subsection 6.2	n/a	x	x	x
Beta ratio range	Paragraph (a) of this section	n/a	x	x	x
Minimum orifice size	§ 3175.80(b)	n/a	n/a	x	x
New FMP orifice plate inspection[1]	§ 3175.80(c)	n/a	x	x	x
Routine orifice plate inspection frequency, in months[1]	§ 3175.80(d)	12	6	3	1
Documentation of orifice plate inspection	§ 3175.80(e)	x	x	x	x
Meter tube construction and condition[2]	§ 3175.80(f)	n/a	x	x	x
Flow conditioners including 19-tube bundles	§ 3175.80(g)	n/a	x	x	x
Basic meter tube inspection frequency, in years[1]	§ 3175.80(h)	n/a	5	2	1
Detailed meter tube inspection[1]	§ 3175.80(i)	n/a	x	x	x
Documentation of detailed meter tube inspection	§ 3175.80(j)	n/a	n/a	x	x
Meter tube length[2]	§ 3175.80(k)	n/a	x	x	x
Thermometer wells	§ 3175.80(l)	n/a	x	x	x
Sample probe location	§ 3175.80(m)	n/a	x	x	x

VL=Very-low-volume FMP; L=Low-volume FMP; H=High-volume FMP; VH=Very-high-volume FMP

[1] = Immediate assessment for non-compliance under § 3175.150

[2] = Applies to all very-high-volume FMPs and meter tubes installed at low- and high-volume FMPs after January 17, 2017. See § 3175.61 for requirements pertaining to meter tubes installed at low- and high-volume FMPs before January 17, 2017.

(a) The Beta ratio must be no less than 0.10 and no greater than 0.75.

(b) The orifice bore diameter must be no less than 0.45 inches.

(c) For FMPs measuring production from wells first coming into production, or from existing wells that have been re-fractured (including FMPs already measuring production from one or more other wells), the operator must inspect the orifice plate upon installation and then every 2 weeks thereafter. If the inspection shows that the orifice plate does not comply with API 14.3.2, Section 4 (incorporated by reference, see §3175.30), the operator must replace

the orifice plate. When the inspection shows that the orifice plate complies with API 14.3.2, Section 4 (incorporated by reference, see § 3175.30), the operator thereafter must inspect the orifice plate as prescribed in paragraph (d) of this section.

(d) The operator must pull and inspect the orifice plate at the frequency (in months) identified in Table 1 to this section. The operator must replace orifice plates that do not comply with API 14.3.2, Section 4 (incorporated by reference, see § 3175.30), with an orifice plate that does comply with these standards.

(e) The operator must retain documentation for every plate inspection and must include that documentation as part of the verification report (see § 3175.92(d) for mechanical recorders, or § 3175.102(e) for EGM systems). The operator must provide that documentation to the BLM upon request. The documentation must include:

(1) The information required in § 3170.7(g) of this part;

(2) Plate orientation (bevel upstream or downstream);

(3) Measured orifice bore diameter;

(4) Plate condition (compliance with API 14.3.2, Section 4 (incorporated by reference, see § 3175.30));

(5) The presence of oil, grease, paraffin, scale, or other contaminants on the plate;

(6) Time and date of inspection; and

(7) Whether or not the plate was replaced.

(f) Meter tubes must meet the requirements of API 14.3.2, Subsections 5.1 through 5.4 (incorporated by reference, see § 3175.30).

(g) If flow conditioners are used, they must be either isolating-flow conditioners approved by the BLM and installed under BLM requirements (see § 3175.46) or 19-tube-bundle flow straighteners constructed in compliance with API 14.3.2, Subsections 5.5.2 through 5.5.4, and located in compliance with API 14.3.2, Subsection 6.3 (incorporated by reference, see § 3175.30).

(h) *Basic meter tube inspection.* The operator must:

(1) Perform a basic inspection of meter tubes within the timeframe (in years) specified in Table 1 to this section;

(2) Conduct a basic inspection that is able to identify obstructions, pitting, and buildup of foreign substances (e.g., grease and scale);

(3) Notify the AO at least 72 hours in advance of performing a basic inspection or submit a monthly or quarterly schedule of basic inspections to the AO in advance;

(4) Conduct additional inspections, as the AO may require, if warranted by conditions, such as corrosive or erosive-flow (e.g., high H_2S or CO_2 content) or signs of physical damage to the meter tube;

(5) Maintain documentation of the findings from the basic meter tube inspection including:

(i) The information required in § 3170.7(g) of this part;

(ii) The time and date of inspection;

(iii) The type of equipment used to make the inspection; and

(iv) A description of findings, including location and severity of pitting, obstructions, and buildup of foreign substances; and

(6) Complete the first inspection after January 17, 2017 within the timeframes (in years) given in Table 1 to this section.

(i) *Detailed meter tube inspection.* (1) Within 30 days of a basic inspection that indicates the presence of pitting, obstructions, or a buildup of foreign substances, the operator must:

(i) For low-volume FMPs, clean the meter tube of obstructions and foreign substances;

(ii) For high- and very-high-volume FMPs, physically measure and inspect the meter tube to determine if the meter tube complies with API 14.3.2, Subsections 5.1 through 5.4 and API 14.3.2, Subsection 6.2 (incorporated by reference, see § 3175.30), or the requirements under § 3175.61(a), if the meter tube is grandfathered under § 3175.61(a). If the meter tube does not comply with the applicable standards, the operator must repair the meter tube to bring the meter tube into compliance with these standards or replace the meter tube with one that meets these standards; or

(iii) Submit a request to the AO for an extension of the 30-day timeframe, justifying the need for the extension.

(2) For all high- and very-high volume FMPs installed after January 17, 2017, the operator must perform a detailed inspection under paragraph (i)(1)(ii) of this section before operation of the meter. The operator may submit documentation showing that the meter tube complies with API 14.3.2, Subsections 5.1 through 5.4 (incorporated by reference, see § 3175.30) in lieu of performing a detailed inspection.

(3) The operator must notify the AO at least 24 hours before performing a detailed inspection.

(j) The operator must retain documentation of all detailed meter tube inspections, demonstrating that the meter tube complies with API 14.3.2, Subsections 5.1 through 5.4 (incorporated by reference, see § 3175.30), and showing all required measurements. The operator must provide such documentation to the BLM upon request for every meter-tube inspection. Documentation must also include the information required in § 3170.7(g) of this part.

(k) *Meter tube lengths.* (1) Meter-tube lengths and the location of 19-tube-bundle flow straighteners, if applicable, must comply with API 14.3.2, Subsection 6.3 (incorporated by reference, see § 3175.30).

(2) For Beta ratios of less than 0.5, the location of 19-tube bundle flow straighteners installed in compliance with AGA Report No. 3 (1985), Section 4.4 (incorporated by reference, see § 3175.30), also complies with the location of 19-tube bundle flow straighteners as required in paragraph (k)(1) of this section.

(3) If the diameter ratio (β) falls between the values in Tables 7, 8a, or 8b of API 14.3.2, Subsection 6.3 (incorporated by reference, see § 3175.30), the length identified for the larger diameter ratio in the appropriate Table is the minimum requirement for meter-tube length and determines the location of the end of the 19-tube-bundle flow straightener closest to the orifice plate. For example, if the calculated diameter ratio is 0.41, use the table entry for a 0.50 diameter ratio.

(l) *Thermometer wells.* (1) Thermometer wells used for determining the flowing temperature of the gas as well as thermometer wells used for verification (test well) must be located in compliance with API 14.3.2, Subsection 6.5 (incorporated by reference, see § 3175.30).

(2) Thermometer wells must be located in such a way that they can sense the same flowing gas temperature that exists at the orifice plate. The operator may accomplish this by physically locating the thermometer well(s) in the same ambient temperature conditions as the primary device (such as in a heated meter house) or by installing insulation and/or heat tracing along the entire meter run. If the operator chooses to use insulation to comply with this requirement, the AO may prescribe the quality of the insulation based on site specific factors such as ambient temperature, flowing temperature of the gas, composition of the gas, and location of the thermometer well in relation to the orifice plate (i.e., inside or outside of a meter house).

(3) Where multiple thermometer wells have been installed in a meter tube, the flowing temperature must be measured from the thermometer well closest to the primary device.

(4) Thermometer wells used to measure or verify flowing temperature must contain a thermally conductive liquid.

(m) The sampling probe must be located as specified in § 3175.112(b).

§ 3175.90 Mechanical recorder (secondary device).

(a) The operator may use a mechanical recorder as a secondary device only on very-low-volume and low-volume FMPs.

(b) Table 1 to this section lists the standards that the operator must follow to install, operate, and maintain mechanical recorders. A requirement applies when a column is marked with an ''x'' or a number.

Table 1 to § 3175.90: Standards for Mechanical Recorders

Standards for Mechanical Recorders			
Subject	Reference	VL	L
Applications for use	Paragraph (a) of this section	x	x
Manifolds and gauge/impulse lines	§ 3175.91(a)	n/a	x
Differential-pressure pen position	§ 3175.91(b)	n/a	x
Flowing temperature recording	§ 3175.91(c)	n/a	x
On-site data requirements	§ 3175.91(d)	x	x
Operating within the element ranges	§ 3175.91(e)	x	x
Verification after installation or following repair[1]	§ 3175.92(a)	x	x
Routine verification and verification frequency, in months[1]	§ 3175.92(b)	6	3
Routine verification procedures	§ 3175.92(c)	x	x
Documentation of verification	§ 3175.92(d)	x	x
Notification of verification	§ 3175.92(e)	x	x
Volume correction	§ 3175.92(f)	n/a	x
Test equipment recertification	§ 3175.92(g)	x	x
Integration statement requirements	§ 3175.93	x	x
Volume determination	§ 3175.94(a)	x	x
Atmospheric pressure	§ 3175.94(b)	x	x
VL=Very-low-volume FMP; L=Low-volume FMP [1] = Immediate assessment for non-compliance under § 3175.150			

§ 3175.91 Installation and operation of mechanical recorders.

(a) Gauge lines connecting the pressure taps to the mechanical recorder must:

(1) Have a nominal diameter of not less than 3/8 inch, including ports and valves;

(2) Be sloped upwards from the pressure taps at a minimum pitch of 1 inch per foot of length with no visible sag;

(3) Be the same internal diameter along their entire length;

(4) Not include tees, except for the static-pressure line;

(5) Not be connected to more than one differential-pressure bellows and static-pressure element, or to any other device; and

(6) Be no longer than 6 feet.

(b) The differential-pressure pen must record at a minimum reading of 10 percent of the differential-pressure-bellows range for the majority of the flowing period. This requirement does not apply to inverted charts.

(c) The flowing temperature of the gas must be continuously recorded and used in the volume calculations under § 3175.94(a)(1).

(d) The following information must be maintained at the FMP in a legible condition, in compliance with § 3170.7(g) of this part, and accessible to the AO at all times:

(1) Differential-pressure-bellows range;

(2) Static-pressure-element range;

(3) Temperature-element range;

(4) Relative density (specific gravity) of the gas;

(5) Static-pressure units of measure (psia or psig);

(6) Meter elevation;

(7) Meter-tube inside diameter;

(8) Primary device type;

(9) Orifice-bore or other primary-device dimensions necessary for device verification, Beta- or area-ratio determination, and gas-volume calculation;

(10) Make, model, and location of approved isolating flow conditioners, if used;

(11) Location of the downstream end of 19-tube-bundle flow straighteners, if used;

(12) Date of last primary-device inspection; and

(13) Date of last meter verification.

(e) The differential pressure, static pressure, and flowing temperature elements must be operated between the lower- and upper-calibrated limits of the respective elements.

§ 3175.92 Verification and calibration of mechanical recorders.

(a) *Verification after installation or following repair.* (1) Before performing any verification of a mechanical recorder required in this part, the operator must perform a leak test. The verification must not proceed if leaks are present. The leak test must be conducted in a manner that will detect leaks in the following:

(i) All connections and fittings of the secondary device, including meter manifolds and verification equipment;

(ii) The isolation valves; and

(iii) The equalizer valves.

(2) The operator must adjust the time lag between the differential- and static-pressure pens, if necessary, to be 1/96 of the chart rotation period, measured at the chart hub. For example, the time lag is 15 minutes on a 24-hour test chart and 2 hours on an 8-day test chart.

(3) The meter's differential pen arc must be able to duplicate the test chart's time arc over the full range of the test chart, and must be adjusted, if necessary.

(4) The as-left values must be verified in the following sequence against a certified pressure device for the differential-pressure and static-pressure elements (if the static-pressure pen has been offset for atmospheric pressure, the static-pressure element range is in psia):

(i) Zero (vented to atmosphere);

(ii) 50 percent of element range;

(iii) 100 percent of element range;

(iv) 80 percent of element range;

(v) 20 percent of element range; and

(vi) Zero (vented to atmosphere).

(5) The following as-left temperatures must be verified by placing the temperature probe in a water bath with a certified test thermometer:

(i) Approximately 10 °F below the lowest expected flowing temperature;

(ii) Approximately 10 °F above the highest expected flowing temperature; and

(iii) At the expected average flowing temperature.

(6) If any of the readings required in paragraph (a)(4) or (5) of this section vary from the test device reading by more than the tolerances shown in Table 1 to this section, the operator must replace and verify the element for which readings were outside the applicable tolerances before returning the meter to service.

Table 1 to § 3175.92: Mechanical Recorder Tolerances

Mechanical Recorder Tolerances	
Element	Allowable Error
Differential Pressure	±0.5%
Static Pressure	±1.0%
Temperature	±2° F

(7) If the static-pressure pen is offset for atmospheric pressure:

(i) The atmospheric pressure must be calculated under appendix A to this subpart; and

(ii) The pen must be offset prior to obtaining the as-left verification values required in paragraph (a)(4) of this section.

(b) *Routine verification frequency.* The differential pressure, static pressure, and temperature elements must be verified under the requirements of this section at the frequency specified in Table 1 to § 3175.90, in months.

(c) *Routine verification procedures.* (1) Before performing any verification required in this part, the operator must perform a leak test in the manner required under paragraph (a)(1) of this section.

(2) No adjustments to the pens or linkages may be made until an as-found verification is obtained. If the static pen has been offset for atmospheric pressure, the static pen must not be reset to zero until the as-found verification is obtained.

(3) The operator must obtain the as-found values of differential and static pressure against a certified pressure device at the readings listed in paragraph (a)(4) of this section, with the following additional requirements:

(i) If there is sufficient data on site to determine the point at which the differential and static pens normally operate, the operator must also obtain an as-found value at those points;

(ii) If there is not sufficient data on site to determine the points at which the differential and static pens normally operate, the operator must also obtain as-found values at 5 percent of the element range and 10 percent of the element range; and

(iii) If the static-pressure pen has been offset for atmospheric pressure, the static-pressure element range is in units of psia.

(4) The as-found value for temperature must be taken using a certified test thermometer placed in a test thermometer well if there is flow through the meter and the meter tube is equipped with a test thermometer well. If there is no flow through the meter or if the meter is not equipped with a test thermometer well, the temperature probe must be verified by placing it along with a test thermometer in an insulated water bath.

(5) The element undergoing verification must be calibrated according to manufacturer specifications if any of the as-found values determined under paragraph (c)(3) or (4) of this section are not within the tolerances shown in Table 1 to this section, when compared to the values applied by the test equipment.

(6) The operator must adjust the time lag between the differential- and static-pressure pens, if necessary, to be 1/96 of the chart rotation period, measured

at the chart hub. For example, the time lag is 15 minutes on a 24-hour test chart and 2 hours on an 8-day test chart.

(7) The meter's differential pen arc must be able to duplicate the test chart's time arc over the full range of the test chart, and must be adjusted, if necessary.

(8) If any adjustment to the meter was made, the operator must perform an as-left verification on each element adjusted using the procedures in paragraphs (c)(3) and (4) of this section.

(9) If, after an as-left verification, any of the readings required in paragraph (c)(3) or (4) of this section vary by more than the tolerances shown in Table 1 to this section when compared with the test-device reading, any element which has readings that are outside of the applicable tolerances must be replaced and verified under this section before the operator returns the meter to service.

(10) If the static-pressure pen is offset for atmospheric pressure:

(i) The atmospheric pressure must be calculated under appendix A to this subpart; and

(ii) The pen must be offset prior to obtaining the as-left verification values required in paragraph (c)(3) of this section.

(d) The operator must retain documentation of each verification, as required under § 3170.7(g) of this part, and submit it to the BLM upon request. This documentation must include:

(1) The time and date of the verification and the prior verification date;

(2) Primary-device data (meter-tube inside diameter and differential-device size and Beta or area ratio) if the orifice plate is pulled and inspected;

(3) The type and location of taps (flange or pipe, upstream or downstream static tap);

(4) Atmospheric pressure used to offset the static-pressure pen, if applicable;

(5) Mechanical recorder data (make, model, and differential pressure, static pressure, and temperature element ranges);

(6) The normal operating points for differential pressure, static pressure, and flowing temperature;

(7) Verification points (as-found and applied) for each element;

(8) Verification points (as-left and applied) for each element, if a calibration was performed;

(9) Names, contact information, and affiliations of the person performing the verification and any witness, if applicable; and

(10) Remarks, if any.

(e) *Notification of verification.* (1) For verifications performed after installation or following repair, the operator must notify the AO at least 72 hours before conducting the verifications.

(2) For routine verifications, the operator must notify the AO at least 72 hours before conducting the verification or submit a monthly or quarterly verification schedule to the AO in advance.

(f) If, during the verification, the combined errors in as-found differential pressure, static pressure, and flowing temperature taken at the normal operating points tested result in a flow-rate error greater than 2 percent or 2 Mcf/day, whichever is greater, the volumes reported on the OGOR and on royalty reports submitted to ONRR must be corrected beginning with the date that the inaccuracy occurred. If that date is unknown, the volumes must be corrected beginning with the production month that includes the date that is half way between the date of the last verification and the date of the current verification. For example: Meter verification determined that the meter was reading 4 Mcf/day high at the normal operating points. The average flow rate measured by the meter is 90 Mcf/day. There is no indication of when the inaccuracy occurred. The date of the current verification was December 15, 2015. The previous verification was conducted on June 15, 2015. The royalty volumes reported on OGOR B that were based on this meter must be corrected for the 4 Mcf/day error back to September 15, 2015.

(g) Test equipment used to verify or calibrate elements at an FMP must be certified at least every 2 years. Documentation of the recertification must be on-site during all verifications and must show:

(1) Test equipment serial number, make, and model;

(2) The date on which the recertification took place;

(3) The test equipment measurement range; and

(4) The uncertainty determined or verified as part of the recertification.

§ 3175.93 Integration statements.

An unedited integration statement must be retained and made available to the BLM upon request. The integration statement must contain the following information:

(a) The information required in § 3170.7(g) of this part;

(b) The name of the company performing the integration;

(c) The month and year for which the integration statement applies;

(d) Meter-tube inside diameter (inches);

(e) The following primary device information, as applicable:

(i) Orifice bore diameter (inches); or

(ii) Beta or area ratio, discharge coefficient, and other information necessary to calculate the flow rate;

(f) Relative density (specific gravity);

(g) CO_2 content (mole percent);

(h) N_2 content (mole percent);

(i) Heating value calculated under § 3175.125 (Btu/standard cubic feet);

(j) Atmospheric pressure or elevation at the FMP;

(k) Pressure base;

(l) Temperature base;

(m) Static-pressure tap location (upstream or downstream);

(n) Chart rotation (hours or days);

(o) Differential-pressure bellows range (inches of water);

(p) Static-pressure element range (psi); and

(q) For each chart or day integrated:

(i) The time and date on and time and date off;

(ii) Average differential pressure (inches of water);

(iii) Average static pressure;

(iv) Static-pressure units of measure (psia or psig);

(v) Average temperature (°F);

(vi) Integrator counts or extension;

(vii) Hours of flow; and

(viii) Volume (Mcf).

§ 3175.94 Volume determination.

(a) The volume for each chart integrated must be determined as follows:

$V = IMV \times IV$

Where:

V = reported volume, Mcf

IMV = integral multiplier value, as calculated under this section

IV = the integral value determined by the integration process (also known as the ''extension,'' ''integrated extension,'' and ''integrator count'')

(1) If the primary device is a flange-tapped orifice plate, a single IMV must be calculated for each chart or chart interval using the following equation:

$$IMV = 7709.61 \frac{C_d Y d^2}{\sqrt{1-\beta^4}} \sqrt{\frac{Z_b}{G_r Z_f T_f}}$$

Where:

C_d = discharge coefficient or flow coefficient, calculated under API 14.3.3 or AGA Report No. 3 (1985), Section 5 (incorporated by reference, see § 3175.30)

β = Beta ratio

Y = gas expansion factor, calculated under API 14.3.3, Subsection 5.6 or AGA Report No. 3 (1985), Section 5 (incorporated by reference, see § 3175.30)

d = orifice diameter, in inches

Z_b = supercompressibility at base pressure and temperature

G_r = relative density (specific gravity)

Z_f = supercompressibility at flowing pressure and temperature

T_f = average flowing temperature, in degrees Rankine

(2) For other types of primary devices, the IMV must be calculated using the equations and procedures recommended by the PMT and approved by the BLM, specific to the make, model, size, and area ratio of the primary device being used.

(3) Variables that are functions of differential pressure, static pressure, or

flowing temperature (e.g., C_d, Y, Z_f) must use the average values of differential pressure, static pressure, and flowing temperature as determined from the integration statement and reported on the integration statement for the chart or chart interval integrated. The flowing temperature must be the average flowing temperature reported on the integration statement for the chart or chart interval being integrated.

(b) Atmospheric pressure used to convert static pressure in psig to static pressure in psia must be determined under appendix A to this subpart.

§ 3175.100 Electronic gas measurement (secondary and tertiary device).

Except as stated in this section, as prescribed in Table 1 to this section, or grandfathered under § 3175.61, the standards and requirements in this section apply to all EGM systems used at FMPs (Note: The following table lists the standards in this subpart and the API standards that the operator must follow to install and maintain EGM systems. A requirement applies when a column is marked with an ''x'' or a number.).

Table 1 to § 3175.100: Standards for Electronic Gas Measurement Systems

Standards for Electronic Gas Measurement Systems					
Subject	Reference (API standards incorporated by reference, see § 3175.30)	VL	L	H	VH
EGM system commissioning	API 21.1, Subsection 7.3	n/a	x	x	x
Access and data security	API 21.1, Section 9	x	x	x	x
No-flow cutoff	API 21.1, Subsection 4.4.5	x	x	x	x
Manifolds and gauge lines	§ 3175.101(a)	n/a	x	x	x
Display requirements	§ 3175.101(b)	x	x	x	x
On-site information	§ 3175.101(c)	x	x	x	x
Operating within the calibrated limits	§ 3175.101(d)	n/a	x	x	x
Flowing-temperature measurement	§ 3175.101(e)	n/a	x	x	x
Verification after installation or following repair[1]	§ 3175.102(a)	x	x	x	x
Routine verification frequency, in months[1]	§ 3175.102(b)	12	6	3	3
Routine verification procedures	§ 3175.102(c)	x	x	x	x
Redundancy verification	§ 3175.102(d)	x	x	x	x
Documentation of verification	§ 3175.102(e)	x	x	x	x
Notification of verification	§ 3175.102(f)	x	x	x	x
Volume correction	§ 3175.102(g)	n/a	x	x	x
Test-equipment requirements	§ 3175.102(h)	x	x	x	x
Flow-rate calculation[2]	§ 3175.103(a)	x	x	x	x
Atmospheric pressure	§ 3175.103(b)	x	x	x	x
Volume calculation	§ 3175.103(c)	x	x	x	x
QTR requirements	§ 3175.104(a)	x	x	x	x
Configuration log requirements	§ 3175.104(b)	x	x	x	x
Event log	§ 3175.104(c)	x	x	x	x
Alarm log	§ 3175.104(d)	x	x	x	x
Accounting systems	§ 3175.104(e)	x	x	x	x

VL=Very-low-volume FMP; L=Low-volume FMP; H=High-volume FMP; VH=Very-high-volume FMP,

[1] = Immediate assessment for non-compliance under § 3175.150

[2] = Applies to all high- and very-high-volume FMPs and FMPs installed at low- and very-low-volume FMPs after January 17, 2017. See § 3175.61 for requirements pertaining to FMPs installed at low- and very-low-volume FMPs before January 17, 2017.

§ 3175.101 Installation and operation of electronic gas measurement systems.

(a) Manifolds and gauge lines connecting the pressure taps to the secondary device must:

(1) Have a nominal diameter of not less than ⅜-inch, including ports and valves;

(2) Be sloped upwards from the pressure taps at a minimum pitch of 1 inch per foot of length with no visible sag;

(3) Have the same internal diameter along their entire length;

(4) Not include tees except for the static-pressure line;

(5) Not be connected to any other devices or more than one differential

pressure and static-pressure transducer. If the operator is employing redundancy verification, two differential pressure and two static-pressure transducers may be connected; and

(6) Be no longer than 6 feet.

(b) Each FMP must include a display, which must:

(1) Be readable without the need for data-collection units, laptop computers, a password, or any special equipment;

(2) Be on site and in a location that is accessible to the AO;

(3) Include the units of measure for each required variable;

(4) Display the software version and previous-day's volume, as well as the following variables consecutively:

(i) Current flowing static pressure with units (psia or psig);

(ii) Current differential pressure (inches of water);

(iii) Current flowing temperature (°F); and

(iv) Current flow rate (Mcf/day or scf/day); and

(5) Either display or post on site and accessible to the AO an hourly or daily QTR (see § 3175.104(a)) no more than 31 days old showing the following information:

(i) Previous-period (for this section, previous period means at least 1 day prior, but no longer than 1 month prior) average differential pressure (inches of water);

(ii) Previous-period average static pressure with units (psia or psig); and

(iii) Previous-period average flowing temperature (°F).

(c) The following information must be maintained at the FMP in a legible condition, in compliance with § 3170.7(g) of this part, and accessible to the AO at all times:

(1) The unique meter ID number;

(2) Relative density (specific gravity);

(3) Elevation of the FMP;

(4) Primary device information, such as orifice bore diameter (inches) or Beta or area ratio and discharge coefficient, as applicable;

(5) Meter-tube mean inside diameter;

(6) Make, model, and location of approved isolating flow conditioners, if used;

(7) Location of the downstream end of 19-tube-bundle flow straighteners, if used;

(8) For self-contained EGM systems, make and model number of the system;

(9) For component-type EGM systems, make and model number of each transducer and the flow computer;

(10) URL and upper calibrated limit for each transducer;

(11) Location of the static-pressure tap (upstream or downstream);

(12) Last primary-device inspection date; and

(13) Last secondary device verification date.

(d) The differential pressure, static pressure, and flowing temperature transducers must be operated between the lower and upper calibrated limits of the transducer. The BLM may approve the differential pressure to exceed the upper calibrated limit of the differential-pressure transducer for brief periods in plunger lift operations; however, the differential pressure may not exceed the URL.

(e) The flowing temperature of the gas must be continuously measured and used in the flow-rate calculations under API 21.1, Section 4 (incorporated by reference, see § 3175.30).

§ 3175.102 Verification and calibration of electronic gas measurement systems.

(a) *Transducer verification and calibration after installation or repair.* (1) Before performing any verification required in this section, the operator must perform a leak test in the manner prescribed in § 3175.92(a)(1).

(2) The operator must verify the points listed in API 21.1, Subsection 7.3.3 (incorporated by reference, see § 3175.30), by comparing the values from the certified test device with the values used by the flow computer to calculate flow rate. If any of these as-left readings vary from the test equipment reading by more than the tolerance determined by API 21.1, Subsection 8.2.2.2, Equation 24 (incorporated by reference, see § 3175.30), then that transducer must be replaced and the new transducer must be tested under this paragraph.

(3) For absolute static-pressure transducers, the value of atmospheric

pressure used when the transducer is vented to atmosphere must be calculated under appendix A to this subpart, measured by a NIST-certified barometer with a stated accuracy of ±0.05 psi or better, or obtained from an absolute-pressure calibration device.

(4) Before putting a meter into service, the differential-pressure transducer must be tested at zero with full working pressure applied to both sides of the transducer. If the absolute value of the transducer reading is greater than the reference accuracy of the transducer, expressed in inches of water column, the transducer must be re-zeroed.

(b) *Routine verification frequency.* (1) If redundancy verification under paragraph (d) of this section is not used, the differential pressure, static pressure, and temperature transducers must be verified under the requirements of paragraph (c) of this section at the frequency specified in Table 1 to § 3175.100, in months; or

(2) If redundancy verification under paragraph (d) of this section is used, the differential pressure, static pressure, and temperature transducers must be verified under the requirements of paragraph (d) of this section. In addition, the transducers must be verified under the requirements of paragraph (c) of this section at least annually.

(c) *Routine verification procedures.* Verifications must be performed according to API 21.1, Subsection 8.2 (incorporated by reference, see § 3175.30), with the following exceptions, additions, and clarifications:

(1) Before performing any verification required under this section, the operator must perform a leak test consistent with § 3175.92(a)(1).

(2) An as-found verification for differential pressure, static pressure and temperature must be conducted at the normal operating point of each transducer.

(i) The normal operating point is the mean value taken over a previous time period not less than 1 day or greater than 1 month. Acceptable mean values include means weighted based on flow time and flow rate.

(ii) For differential and static-pressure transducers, the pressure applied to the transducer for this verification must be within five percentage points of the normal operating point. For example, if the normal operating point for differential pressure is 17 percent of the upper calibrated limit, the normal point verification pressure must be between 12 percent and 22 percent of the upper calibrated limit.

(iii) For the temperature transducer, the water bath or test thermometer well must be within 20 °F of the normal operating point for temperature.

(3) If any of the as-found values are in error by more than the manufacturer's specification for stability or drift—as adjusted for static pressure and ambient temperature—on two consecutive verifications, that transducer must be replaced prior to returning the meter to service.

(4) If a transducer is calibrated, the as-left verification must include the normal operating point of that transducer, as defined in paragraph (c)(2) of this section.

(5) The as-found values for differential pressure obtained with the low side vented to atmospheric pressure must be corrected to working-pressure values using API 21.1, Annex H, Equation H.1 (incorporated by reference, see § 3175.30).

(6) The verification tolerance for differential and static pressure is defined by API 21.1, Subsection 8.2.2.2, Equation 24 (incorporated by reference, see § 3175.30). The verification tolerance for temperature is equivalent to the uncertainty of the temperature transmitter or 0.5 °F, whichever is greater.

(7) All required verification points must be within the verification tolerance before returning the meter to service.

(8) Before putting a meter into service, the differential-pressure transducer must be tested at zero with full working pressure applied to both sides of the transducer. If the absolute value of the transducer reading is greater than the reference accuracy of the transducer, expressed in inches of water column, the transducer must be re-zeroed.

(d) *Redundancy verification procedures.* Redundancy verifications must be performed as required under API 21.1, Subsection 8.2 (incorporated by reference,

see §3175.30), with the following exceptions, additions, and clarifications:

(1) The operator must identify which set of transducers is used for reporting on the OGOR (the primary transducers) and which set of transducers is used as a check (the check set of transducers);

(2) For every calendar month, the operator must compare the flow-time linear averages of differential pressure, static pressure, and temperature readings from the primary transducers with those from the check transducers;

(3)(i) If for any transducer the difference between the averages exceeds the tolerance defined by the following equation:

$$Tolerance = \sqrt{A_p^2 + A_c^2}$$

Where:

A_p is the reference accuracy of the primary transducer and

A_c is the reference accuracy of the check transducer.

(ii) The operator must verify both the primary and check transducer under paragraph (c) of this section within the first 5 days of the month following the month in which the redundancy verification was performed. For example, if the redundancy verification for March reveals that the difference in the flow-time linear averages of differential pressure exceeded the verification tolerance, both the primary and check differential-pressure transducers must be verified under paragraph (c) of this section by April 5th.

(e) The operator must retain documentation of each verification for the period required under §3170.7 of this part, including calibration data for transducers that were replaced, and submit it to the BLM upon request.

(1) For routine verifications, this documentation must include:

(i) The information required in §3170.7(g) of this part;

(ii) The time and date of the verification and the last verification date;

(iii) Primary device data (meter-tube inside diameter and differential-device size, Beta or area ratio);

(iv) The type and location of taps (flange or pipe, upstream or downstream static tap);

(v) The flow computer make and model;

(vi) The make and model number for each transducer, for component-type EGM systems;

(vii) Transducer data (make, model, differential, static, temperature URL, and upper calibrated limit);

(viii) The normal operating points for differential pressure, static pressure, and flowing temperature;

(ix) Atmospheric pressure;

(x) Verification points (as-found and applied) for each transducer;

(xi) Verification points (as-left and applied) for each transducer, if calibration was performed;

(xii) The differential device inspection date and condition (e.g., clean, sharp edge, or surface condition);

(xiii) Verification equipment make, model, range, accuracy, and last certification date;

(xiv) The name, contact information, and affiliation of the person performing the verification and any witness, if applicable; and

(xv) Remarks, if any.

(2) For redundancy verification checks, this documentation must include;

(i) The information required in §3170.7(g) of this part;

(ii) The month and year for which the redundancy check applies;

(iii) The makes, models, upper range limits, and upper calibrated limits of the primary set of transducers;

(iv) The makes, models, upper range limits, and upper calibrated limits of the check set of transducers;

(v) The information required in API 21.1, Annex I (incorporated by reference, see §3175.30);

(vii) The tolerance for differential pressure, static pressure, and temperature as calculated under paragraph (d)(2) of this section; and

(viii) Whether or not each transducer required verification under paragraph (c) of this section.

(f) *Notification of verification.* (1) For verifications performed after installation or following repair, the operator must notify the AO at least 72 hours before conducting the verifications.

(2) For routine verifications, the operator must notify the AO at least 72 hours before conducting the verification or submit a monthly or quarterly verification schedule to the AO in advance.

(g) If, during the verification, the combined errors in as-found differential pressure, static pressure, and flowing temperature taken at the normal operating points tested result in a flow-rate error greater than 2 percent or 2 Mcf/day, whichever is greater, the volumes reported on the OGOR and on royalty reports submitted to ONRR must be corrected beginning with the date that the inaccuracy occurred. If that date is unknown, the volumes must be corrected beginning with the production month that includes the date that is half way between the date of the last verification and the date of the present verification. See the example in § 3175.92(f).

(h) *Test equipment requirements.* (1) Test equipment used to verify or calibrate transducers at an FMP must be certified at least every 2 years. Documentation of the certification must be on site and made available to the AO during all verifications and must show:

(i) The test equipment serial number, make, and model;

(ii) The date on which the recertification took place;

(iii) The range of the test equipment; and

(iv) The uncertainty determined or verified as part of the recertification.

(2) Test equipment used to verify or calibrate transducers at an FMP must meet the following accuracy standards:

(i) The accuracy of the test equipment, stated in actual units of measure, must be no greater than 0.5 times the reference accuracy of the transducer being verified, also stated in actual units of measure; or

(ii) The equipment must have a stated accuracy of at least 0.10 percent of the upper calibrated limit of the transducer being verified.

§ 3175.103 Flow rate, volume, and average value calculation.

(a) The flow rate must be calculated as follows:

(1) For flange-tapped orifice plates, the flow rate must be calculated under:

(i) API 14.3.3, Section 4 and API 14.3.3, Section 5 (incorporated by reference, see § 3175.30); and

(ii) AGA Report No. 8 (incorporated by reference, see § 3175.30), for supercompressibility.

(2) For primary devices other than flange-tapped orifice plates, for which there are no industry standards, the flow rate must be calculated under the equations and procedures recommended by the PMT and approved by the BLM, specific to the make, model, size, and area ratio of the primary device used.

(b) Atmospheric pressure used to convert static pressure in psig to static pressure in psia must be determined under API 21.1, Subsection 8.3.3 (incorporated by reference, see § 3175.30).

(c) Hourly and daily gas volumes, average values of the live input variables, flow time, and integral value or average extension as required under § 3175.104 must be determined under API 21.1, Section 4 and API 21.1, Annex B (incorporated by reference, see § 3175.30).

§ 3175.104 Logs and records.

(a) The operator must retain, and submit to the BLM upon request, the original, unaltered, unprocessed, and unedited daily and hourly QTRs, which must contain the information identified in API 21.1, Subsection 5.2 (incorporated by reference, see § 3175.30), with the following additions and clarifications:

(1) The information required in § 3170.7(g) of this part;

(2) The volume, flow time, and integral value or average extension must be reported to at least 5 decimal places. The average differential pressure, static pressure, and temperature

as calculated in §3175.103(c), must be reported to at least three decimal places; and

(3) A statement of whether the operator has submitted the integral value or average extension.

(b) The operator must retain, and submit to the BLM upon request, the original, unaltered, unprocessed, and unedited configuration log, which must contain the information specified in API 21.1, Subsection 5.4 (including the flow-computer snapshot report in API 21.1, Subsection 5.4.2), and API 21.1, Annex G (incorporated by reference, see §3175.30), with the following additions and clarifications:

(1) The information required in §3170.7(g) of this part;

(2) Software/firmware identifiers under API 21.1, Subsection 5.3 (incorporated by reference, see §3175.30);

(3) For very-low-volume FMPs only, the fixed temperature, if not continuously measured (°F); and

(4) The static-pressure tap location (upstream or downstream).

(c) The operator must retain, and submit to the BLM upon request, the original, unaltered, unprocessed, and unedited event log. The event log must comply with API 21.1, Subsection 5.5 (incorporated by reference, see §3175.30), with the following additions and clarifications: The event log must have sufficient capacity and must be retrieved and stored at intervals frequent enough to maintain a continuous record of events as required under §3170.7 of this part, or the life of the FMP, whichever is shorter.

(d) The operator must retain an alarm log and provide it to the BLM upon request. The alarm log must comply with API 21.1, Subsection 5.6 (incorporated by reference, see §3175.30).

(e) Records may only be submitted from accounting system names and versions and flow computer makes and models that have been approved by the BLM (see §3175.49).

§ 3175.110 Gas sampling and analysis.

Except as stated in this section or as prescribed in Table 1 to this section, the standards and requirements in this section apply to all gas sampling and analyses. (Note: The following table lists the standards in this subpart and the API standards that the operator must follow to take a gas sample, analyze the gas sample, and report the findings of the gas analysis. A requirement applies when a column is marked with an ''x'' or a number.)

Table 1 to § 3175.110: Gas Sampling and Analysis

Gas Sampling and Analysis					
Subject	Reference	VL	L	H	VH
Methods of sampling	§ 3175.111(a)	x	x	x	x
Heating requirements	§ 3175.111(b)	x	x	x	x
Samples taken from probes	§ 3175.112(a)	n/a	x	x	x
Location of sample probe	§ 3175.112(b)	n/a	x	x	x
Sample probe design and type	§ 3175.112(c)	n/a	x	x	x
Sample tubing	§ 3175.112(d)	n/a	x	x	x
Spot sample while flowing	§ 3175.113(a)	x	x	x	x
Notification of spot samples	§ 3175.113(b)	x	x	x	x
Sample cylinder requirements	§ 3175.113(c)	x	x	x	x
Spot sampling using portable GCs	§ 3175.113(d)	x	x	x	x
Allowable methods of spot sampling	§ 3175.114(a)	x	x	x	x
Low pressure sampling	§ 3175.114(b)	x	x	x	x
Spot sampling frequency, low- and very-low-volume FMPs (in months)[1]	§ 3175.115(a)	12	6	n/a	n/a
Initial spot sampling frequency, high- and very-high-volume FMPs (in months)[1]	§ 3175.115(a)	n/a	n/a	3	1
Adjustment of spot sampling frequencies, high- and very-high-volume FMPs	§ 3175.115(b)	n/a	n/a	x	x
Maximum time between samples	§ 3175.115(c)	x	x	x	x
Installation of composite sampler or on-line GC	§ 3175.115(d)	x	x	x	x
Removal of composite sampler or on-line GC	§ 3175.115(e)	x	x	x	x
Composite sampling methods	§ 3175.116	x	x	x	x
On-line gas chromatographs	§ 3175.117	x	x	x	x
Gas chromatograph requirements	§ 3175.118	x	x	x	x
Minimum components to analyze	§ 3175.119(a)	x	x	x	x
Extended analysis	§ 3175.119(b) and (c)	n/a	n/a	x	x
Gas analysis report requirements	§ 3175.120	x	x	x	x
Effective date of spot and composite samples	§ 3175.121	x	x	x	x
VL=Very-low-volume FMP; L=Low-volume FMP; H=High-volume FMP; VH=Very-high-volume FMP, [1] = Immediate assessment for non-compliance under § 3175.150					

§ 3175.111 General sampling requirements.

(a) Samples must be taken by one of the following methods:

(1) Spot sampling under §§ 3175.113 through 3175.115;

(2) Flow-proportional composite sampling under § 3175.116; or

(3) On-line gas chromatograph under § 3175.117.

(b) At all times during the sampling process, the minimum temperature of all gas sampling components must be the lesser of:

(1) The flowing temperature of the gas measured at the time of sampling; or

(2) 30 °F above the calculated hydrocarbon dew point of the gas.

§ 3175.112 Sampling probe and tubing.

(a) All gas samples must be taken from a sample probe that complies with the requirements of paragraphs (b) and (c) of this section.

(b) *Location of sample probe.* (1) The sample probe must be located in the meter tube in accordance with API 14.1, Subsection 6.4.2 (incorporated by reference, see § 3175.30), and must be the first obstruction downstream of the primary device.

(2) The sample probe must be exposed to the same ambient temperature as the primary device. The operator may accomplish this by physically locating the sample probe in the same ambient temperature conditions as the primary device (such as in a heated meter house) or by installing insulation and/or heat tracing along the entire meter run. If the operator chooses to use insulation to comply with this requirement, the AO may prescribe the quality of the insulation based on site specific factors such as ambient temperature, flowing temperature of the gas, composition of the gas, and location of the sample probe in relation to the orifice plate (i.e., inside or outside of a meter house).

(c) *Sample probe design and type.* (1) Sample probes must be constructed from stainless steel.

(2) If a regulating type of sample probe is used, the pressure-regulating mechanism must be inside the pipe or maintained at a temperature of at least 30 °F above the hydrocarbon dew point of the gas.

(3) The sample probe length must be the shorter of:

(i) The length necessary to place the collection end of the probe in the center one third of the pipe cross-section; or

(ii) The recommended length of the probe in Table 1 in API 14.1, Subsection 6.4 (incorporated by reference, see § 3175.30).

(4) The use of membranes, screens, or filters at any point in the sample probe is prohibited.

(d) Sample tubing connecting the sample probe to the sample container or analyzer must be constructed of stainless steel or nylon 11.

§ 3175.113 Spot samples—general requirements.

(a) If an FMP is not flowing at the time that a sample is due, a sample must be taken within 15 days after flow is re-initiated. Documentation of the non-flowing status of the FMP must be entered into GARVS as required under § 3175.120(f).

(b) The operator must notify the AO at least 72 hours before obtaining a spot sample as required by this subpart, or submit a monthly or quarterly schedule of spot samples to the AO in advance of taking samples.

(c) *Sample cylinder requirements.* Sample cylinders must:

(1) Comply with API 14.1, Subsection 9.1 (incorporated by reference, see § 3175.30);

(2) Have a minimum capacity of 300 cubic centimeters; and

(3) Be cleaned before sampling under GPA 2166–05, Appendix A (incorporated by reference, see § 3175.30), or an equivalent method. The operator must maintain documentation of cleaning (see § 3170.7), have the documentation available on site during sampling, and provide it to the BLM upon request.

(d) *Spot sampling using portable gas chromatographs.* (1) Sampling separators, if used, must:

(i) Be constructed of stainless steel;

(ii) Be cleaned under GPA 2166–05, Appendix A (incorporated by reference, see § 3175.30), or an equivalent method, prior to sampling. The operator must maintain documentation of cleaning

(see § 3170.7), have the documentation available on site during sampling, and provide it to the BLM upon request; and

(iii) Be operated under GPA 2166–05, Appendix B.3 (incorporated by reference, see § 3175.30).

(2) The sample port and inlet to the sample line must be purged using the gas being sampled before completing the connection between them.

(3) The portable GC must be operated, verified, and calibrated under § 3175.118.

(4) The documentation of verification or calibration required in § 3175.118(d) must be available for inspection by the BLM at the time of sampling.

(5) *Minimum number of samples and analyses.* (i) For low- and very-low-volume FMPs, at least three samples must be taken and analyzed;

(ii) For high-volume FMPs, samples must be taken and analyzed until the difference between the maximum heating value and minimum heating value calculated from three consecutive analyses is less than or equal to 16 Btu/scf;

(iii) For very-high-volume FMPs, samples must be taken and analyzed until the difference between the maximum heating value and minimum heating value calculated from three consecutive analyses is less than or equal to 8 Btu/scf.

(6) The heating value and relative density used for OGOR reporting must be:

(i) The mean heating value and relative density calculated from the three analyses required in paragraph (d)(5) of this section;

(ii) The median heating value and relative density calculated from the three analyses required in paragraph (d)(5) of this section; or

(iii) Any other method approved by the BLM.

§ 3175.114 Spot samples—allowable methods.

(a) Spot samples must be obtained using one of the following methods:

(1) *Purging—fill and empty method.* Samples taken using this method must comply with GPA 2166–05, Section 9.1 (incorporated by reference, see § 3175.30);

(2) *Helium ''pop'' method.* Samples taken using this method must comply with GPA 2166–05, Section 9.5 (incorporated by reference, see § 3175.30). The operator must maintain documentation demonstrating that the cylinder was evacuated and pre-charged before sampling and make the documentation available to the AO upon request;

(3) *Floating piston cylinder method.* Samples taken using this method must comply with GPA 2166–05, Sections 9.7.1 to 9.7.3 (incorporated by reference, see § 3175.30). The operator must maintain documentation of the seal material and type of lubricant used and make the documentation available to the AO upon request;

(4) *Portable gas chromatograph.* Samples taken using this method must comply with § 3175.118; or

(5) Other methods approved by the BLM (through the PMT) and posted at *www.blm.gov*.

(b) If the operator uses either a purging—fill and empty method or a helium ''pop'' method, and if the flowing pressure at the sample port is less than or equal to 15 psig, the operator may also employ a vacuum-gathering system. Samples taken using a vacuum-gathering system must comply with API 14.1, Subsection 11.10 (incorporated by reference, see § 3175.30), and the samples must be obtained from the discharge of the vacuum pump.

§ 3175.115 Spot samples—frequency.

(a) Unless otherwise required under paragraph (b) of this section, spot samples for all FMPs must be taken and analyzed at the frequency (once during every period, stated in months) prescribed in Table 1 to § 3175.110.

(b) After the time frames listed in paragraph (b)(1) of this section, the BLM may change the required sampling frequency for high-volume and very-high-volume FMPs if the BLM determines that the sampling frequency required in Table 1 in § 3175.110 is not sufficient to achieve the heating value uncertainty levels required in § 3175.31(b).

(1) *Timeframes for implementation.* (i) For high-volume FMPs, the BLM may change the sampling frequency no

sooner than 2 years after the FMP begins measuring gas or January 19, 2021, whichever is later; and

(ii) For very-high-volume FMPs, the BLM may change the sampling frequency or require compliance with paragraph (b)(5) of this section no sooner than 1 year after the FMP begins measuring gas or January 17, 2020, whichever is later.

(2) The BLM will calculate the new sampling frequency needed to achieve the heating value uncertainty levels required in § 3175.31(b). The BLM will base the sampling frequency calculation on the heating value variability. The BLM will notify the operator of the new sampling frequency.

(3) The new sampling frequency will remain in effect until the heating value variability justifies a different frequency.

(4) The new sampling frequency will not be more frequent than once every 2 weeks nor less frequent than once every 6 months.

(5) For very-high-volume FMPs, the BLM may require the installation of a composite sampling system or on-line GC if the heating value uncertainty levels in § 3175.31(b) cannot be achieved through spot sampling. Composite sampling systems or on-line gas chromatographs that are installed and operated in accordance with this section comply with the uncertainty requirement of § 3175.31(b)(2).

(c) The time between any two samples must not exceed the timeframes shown in Table 1 to this section.

Table 1 to § 3175.115: Maximum Time Between Samples

Maximum Time Between Samples	
If the required sampling frequency is once during every:	Then the maximum time between samples (in days) is:
2 weeks	18
Month	45
2 months	75
3 months	105
6 months	195
12 months	380

(d) If a composite sampling system or an on-line GC is installed under § 3175.116 or § 3175.117, either on the operator's own initiative or in response to a BLM order for a very-high-volume FMP under paragraph (b)(5) of this section, it must be installed and operational no more than 30 days after the due date of the next sample.

(e) The required sampling frequency for an FMP at which a composite sampling system or an on-line gas chromatograph is removed from service is prescribed in paragraph (a) of this section.

§ 3175.116 Composite sampling methods.

(a) Composite samplers must be flow-proportional.

(b) Samples must be collected using a positive-displacement pump.

(c) Sample cylinders must be sized to ensure the cylinder capacity is not exceeded within the normal collection frequency.

§ 3175.117 On-line gas chromatographs.

(a) On-line GCs must be installed, operated, and maintained under GPA 2166–05, Appendix D (incorporated by reference, see § 3175.30), and the manufacturer's specifications, instructions, and recommendations.

(b) The GC must comply with the verification and calibration requirements of § 3175.118. The results of all verifications must be submitted to the AO upon request.

(c) Upon request, the operator must submit to the AO the manufacturer's specifications and installation and operational recommendations.

§ 3175.118 Gas chromatograph requirements.

(a) All GCs must be installed, operated, and calibrated under GPA 2261–13 (incorporated by reference, see § 3175.30).

(b) Samples must be analyzed until the un-normalized sum of the mole percent of all gases analyzed is between 97 and 103 percent.

(c) A GC may not be used to analyze any sample from an FMP until the verification meets the standards of this paragraph (c).

(1) GCs must be verified under GPA 2261–13, Section 6 (incorporated by reference, see § 3175.30), not less than once every 7 days.

(2) All gases used for verification and calibration must meet the standards of GPA 2198–03, Sections 3 and 4 (incorporated by reference, see § 3175.30).

(3) All new gases used for verification and calibration must be authenticated prior to verification or calibration under the standards of GPA 2198–03, Section 5 (incorporated by reference, see § 3175.30).

(4) The gas used to calibrate a GC must be maintained under Section 6 of GPA 2198–03 (incorporated by reference, see § 3175.30).

(5) If the composition of the gas used for verification as determined by the GC varies from the certified composition of the gas used for verification by more than the reproducibility values listed in GPA 2261–13, Section 10 (incorporated by reference, see § 3175.30), the GC must be calibrated under GPA 2261–13, Section 6 (incorporated by reference, see § 3175.30).

(6) If the GC is calibrated, it must be re-verified under paragraph (c)(5) of this section.

(d) The operator must retain documentation of the verifications for the period required under § 3170.6 of this part, and make it available to the BLM upon request. The documentation must include:

(1) The components analyzed;

(2) The response factor for each component;

(3) The peak area for each component;

(4) The mole percent of each component as determined by the GC;

(5) The mole percent of each component in the gas used for verification;

(6) The difference between the mole percents determined in paragraphs (d)(4) and (5) of this section, expressed in relative percent;

(7) Evidence that the gas used for verification and calibration:

(i) Meets the requirements of paragraph (c)(2) of this section, including a unique identification number of the calibration gas used, the name of the supplier of the calibration gas, and the certified list of the mole percent of each component in the calibration gas;

(ii) Was authenticated under paragraph (c)(3) of this section prior to verification or calibration, including the fidelity plots; and

(iii) Was maintained under paragraph (c)(4) of this section, including the fidelity plot made as part of the calibration run;

(8) The chromatograms generated during the verification process;

(9) The time and date the verification was performed; and

(10) The name and affiliation of the person performing the verification.

(e) Extended analyses must be taken in accordance with GPA 2286–14 (incorporated by reference, see § 3175.30) or other method approved by the BLM.

§ 3175.119 Components to analyze.

(a) The gas must be analyzed for the following components:

(1) Methane;
(2) Ethane;
(3) Propane;
(4) Iso Butane;
(5) Normal Butane;
(6) Pentanes;
(7) Hexanes + (C_6+);
(8) Carbon dioxide; and
(9) Nitrogen.

(b) When the concentration of C_6+ exceeds 0.5 mole percent, the following gas components must also be analyzed:
(1) Hexanes;
(2) Heptanes;
(3) Octanes; and
(4) Nonanes +.

(c) In lieu of testing each sample for the components required under paragraph (b) of this section, the operator may periodically test for these components and adjust the assumed C_6+ composition to remove bias in the heating value (see § 3175.126(a)(3)). The C_6+ composition must be applied to the mole percent of C_6+ analyses until the next analysis is done under paragraph (b) of this section. The minimum analysis frequency for the components listed in paragraph (b) of this section is as follows:

(1) For high-volume FMPs, once per year; and

(2) For very-high-volume FMPs, once every 6 months.

§ 3175.120 Gas analysis report requirements.

(a) The gas analysis report must contain the following information:

(1) The information required in § 3170.7(g) of this part;

(2) The date and time that the sample for spot samples was taken or, for composite samples, the date the cylinder was installed and the date the cylinder was removed;

(3) The date and time of the analysis;

(4) For spot samples, the effective date, if other than the date of sampling;

(5) For composite samples, the effective start and end date;

(6) The name of the laboratory where the analysis was performed;

(7) The device used for analysis (i.e., GC, calorimeter, or mass spectrometer);

(8) The make and model of analyzer;

(9) The date of last calibration or verification of the analyzer;

(10) The flowing temperature at the time of sampling;

(11) The flowing pressure at the time of sampling, including units of measure (psia or psig);

(12) The flow rate at the time of sampling;

(13) The ambient air temperature at the time of sampling;

(14) Whether or not heat trace or any other method of heating was used;

(15) The type of sample (i.e., spot-cylinder, spot-portable GC, composite);

(16) The sampling method if spot-cylinder (e.g., fill and empty, helium pop);

(17) A list of the components of the gas tested;

(18) The un-normalized mole percents of the components tested, including a summation of those mole percents;

(19) The normalized mole percent of each component tested, including a summation of those mole percents;

(20) The ideal heating value (Btu/scf);

(21) The real heating value (Btu/scf), dry basis;

(22) The hexane+ split, if applicable;

(23) The pressure base and temperature base;

(24) The relative density; and

(25) The name of the company obtaining the gas sample.

(b) Components that are listed on the analysis report, but not tested, must be annotated as such.

(c) The heating value and relative density must be calculated under API 14.5 (incorporated by reference, see § 3175.30).

(d) The base supercompressibility must be calculated under AGA Report No. 8 (incorporated by reference, see § 3175.30).

(e) The operator must submit all gas analysis reports to the BLM within 15 days of the due date for the sample as specified in § 3175.115.

(f) Unless a variance is granted, the operator must submit all gas analysis reports and other required related information electronically through the GARVS. The BLM will grant a variance to the electronic-submission requirement only in cases where the operator demonstrates that it is a small business, as defined by the U.S. Small

Business Administration, and does not have access to the Internet.

§ 3175.121 Effective date of a spot or composite gas sample.

(a) Unless otherwise specified on the gas analysis report, the effective date of a spot sample is the date on which the sample was taken.

(b) The effective date of a spot gas sample may be no later than the first day of the production month following the operator's receipt of the laboratory analysis of the sample.

(c) Unless otherwise specified on the gas analysis report, the effective date of a composite sample is the first of the month in which the sample was removed.

(d) The provisions of this section apply only to OGORs, QTRs, and gas sample reports generated after January 17, 2017.

§ 3175.125 Calculation of heating value and volume

(a) The heating value of the gas sampled must be calculated as follows:

(1) Gross heating value is defined by API 14.5, Subsection 3.7 (incorporated by reference, see § 3175.30) and must be calculated under API 14.5, Subsection 7.1 (incorporated by reference, see § 3175.30); and

(2) Real heating value must be calculated by dividing the gross heating value of the gas calculated under paragraph (a)(1) of this section by the compressibility factor of the gas at 14.73 psia and 60 °F.

(b) *Average heating value determination.* (1) If a lease, unit PA, or CA has more than one FMP, the average heating value for the lease, unit PA, or CA for a reporting month must be the volume-weighted average of heating values, calculated as follows:

$$\overline{HV} = \frac{\sum_{i=1}^{i=n} (HV_i \times V_i)}{\sum_{i=1}^{i=n} V_i}$$

Where:

$\overline{HV}$ = the average heating value for the lease, unit PA, or CA, for the reporting month, in Btu/scf

HV_i = the heating value for FMP_i, during the reporting month (see § 3175.120(b)(2) if an FMP has multiple heating values during the reporting month), in Btu/scf

V_i = the volume measured by FMPi, during the reporting month, in Btu/scf

Subscript i represents each FMP for the lease, unit PA, or CA

n = the number of FMPs for the lease, unit PA, or CA

(2) If the effective date of a heating value for an FMP is other than the first day of the reporting month, the average heating value of the FMP must be the volume-weighted average of heating values, determined as follows:

$$HV_i = \frac{\sum_{j=1}^{j=m}\left(HV_{i,j} \times V_{i,j}\right)}{\sum_{j=1}^{j=m} V_{i,j}}$$

Where:

HV_i = the heating value for FMP_i, in Btu/scf

$HV_{i,j}$ = the heating value for FMP_i, for partial month j, in Btu/scf

$V_{i,j}$ = the volume measured by FMP_i, for partial month j, in Btu/scf

Subscript i represents each FMP for the lease, unit PA, or CA

Subscript j represents a partial month for which heating value $HV_{i,j}$ is effective

m = the number of different heating values in a reporting month for an FMP

(c) The volume must be determined under §3175.94 (mechanical recorders) or §3175.103(c) (EGM systems).

§3175.126 Reporting of heating value and volume.

(a) The gross heating value and real heating value, or average gross heating value and average real heating value, as applicable, derived from all samples and analyses must be reported on the OGOR in units of Btu/scf under the following conditions:

(1) Containing no water vapor (''dry''), unless the water vapor content has been determined through actual on-site measurement and reported on the gas analysis report. The heating value may not be reported on the basis of an assumed water-vapor content. Acceptable methods of measuring water vapor are:

(i) Chilled mirror;

(ii) Laser detectors; and

(iii) Other methods approved by the BLM;

(2) Adjusted to a pressure of 14.73 psia and a temperature of 60 °F; and

(3) For samples analyzed under §3175.119(a), and notwithstanding any provision of a contract between the operator and a purchaser or transporter, the composition of hexane+ is deemed to be:

(i) 60 percent n-hexane, 30 percent n-heptane, and 10 percent n-octane; or

(ii) The composition determined under §3175.119(c).

(b) The volume for royalty purposes must be reported on the OGOR in units of Mcf as follows:

(1) The volume must not be adjusted for water-vapor content or any other factors that are not included in the calculations required in §3175.94 or §3175.103; and

(2) The volume must match the monthly volume(s) shown in the unedited QTR(s) or integration statement(s) unless edits to the data are documented under paragraph (c) of this section.

(c) *Edits and adjustments to reported volume or heating value.* (1) If for any reason there are measurement errors stemming from an equipment malfunction that results in discrepancies to the calculated volume or heating value of the gas, the volume or heating value reported during the period in which the volume or heating value error persisted must be estimated.

(2) All edits made to the data before the submission of the OGOR must be documented and include verifiable justifications for the edits made. This documentation must be maintained under §3170.7 of this part and must be submitted to the BLM upon request.

(3) All values on daily and hourly QTRs that have been changed or edited must be clearly identified and must be cross referenced to the justification required in paragraph (c)(2) of this section.

(4) The volumes reported on the OGOR must be corrected beginning with the date that the inaccuracy occurred. If that date is unknown, the volumes must be corrected beginning with the production month that includes the date that is half way between the date of the previous verification and the most recent verification date.

§ 3175.130 Transducer testing protocol.

The BLM will approve a particular make, model, and range of differential-pressure, static-pressure, or temperature transducer for use in an EGM system only if the testing performed on the transducer met all of the standards and requirements stated in §§ 3175.131 through 3175.135.

§ 3175.131 General requirements for transducer testing.

(a) All testing must be performed by a qualified test facility.

(b) *Number and selection of transducers tested.* (1) A minimum of five transducers of the same make, model, and URL, selected at random from the stock used to supply normal field operations, must be type-tested.

(2) The serial number of each transducer selected must be documented. The date, location, and batch identifier, if applicable, of manufacture must be ascertainable from the serial number.

(3) For the purpose of this section, the term ''model'' refers to the base model number on which the BLM determines the transducer performance. For example: A manufacturer makes a transmitter with a model number 1234–XYZ, where ''1234'' identifies the transmitter cell, ''X'' identifies the output type, ''Y'' identifies the mounting type, and ''Z'' identifies where the static pressure is taken. The testing under this section would only be required on the base model number (''1234''), assuming that ''X'', ''Y'', or ''Z'' does not affect the performance of the transmitter.

(4) For multi-variable transducers, each cell URL must be tested only once under this section. For example: A manufacturer of a transducer measuring both differential and static pressure makes a model with available differential-pressure URLs of 100 inches, 500 inches, and 1,000 inches, and static-pressure URLs of 250 psia, 1,000 psia, and 2,500 psia. Although there are nine possible combinations of differential-pressure and static-pressure URLs, only six tests are required to cover each cell URL.

(c) *Test conditions—general.* The electrical supply must meet the following minimum tolerances:

(1) *Rated voltage:* ±1 percent uncertainty;

(2) *Rated frequency:* ±1 percent uncertainty;

(3) Alternating current harmonic distortion: Less than 5 percent; and

(4) *Direct current ripple:* Less than 0.10 percent uncertainty.

(d) The input and output (if the output is analog) of each transducer must be measured with equipment that has a published reference uncertainty less than or equal to 25 percent of the published reference uncertainty of the transducer under test across the measurement range common to both the transducer under test and the test instrument. Reference uncertainty for both the test instrument and the transducer under test must be expressed in the units the transducer measures to determine acceptable uncertainty. For example, if the transducer under test has a published reference uncertainty of ±0.05 percent of span, and a span of 0 to 500 psia, then this transducer has a reference accuracy of ±0.25 psia (0.05 percent of 500 psia). To meet the requirements of this paragraph (d), the test instrument in this example must have an uncertainty of ±0.0625 psia or less (25 percent of ±0.25 psia).

(e) If the manufacturer's performance specifications for the transducer under test include corrections made by an external device (such as linearization), then the external device must be tested along with the transducer and be connected to the transducer in the same way as in normal field operations.

(f) If the manufacturer specifies the extent to which the measurement range of the transducer under test may be adjusted downward (i.e., spanned down), then each test required in §§ 3175.132 and 3175.133 must be carried out at least at both the URL and the minimum upper calibrated limit specified by the manufacturer. For upper calibrated limits between the maximum and the minimum span that are not tested, the BLM will use the greater of the uncertainties measured at the maximum and minimum spans in determining compliance with the requirements of § 3175.31(a).

(g) After initial calibration, no calibration adjustments to the transducer

may be made until all required tests in §§ 3175.132 and 3175.133 are completed.

(h) For all of the testing required in §§ 3175.132 and 3175.133, the term ''tested for accuracy'' means a comparison between the output of the transducer under test and the test equipment taken as follows:

(1) The following values must be tested in the order shown, expressed as a percent of the transducer span:

(i) (Ascending values) 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100; and

(ii) (Descending values) 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, and 0.

(2) If the device under test is an absolute-pressure transducer, the ''0'' values listed in paragraphs (h)(1)(i) and (ii) of this section must be replaced with ''atmospheric pressure at the test facility;''

(3) Input approaching each required test point must be applied asymptotically without overshooting the test point;

(4) The comparison of the transducer and the test equipment measurements must be recorded at each required point; and

(5) For static-pressure transducers, the following test point must be included for all tests:

(i) For gauge-pressure transducers, a gauge pressure of −5 psig; and

(ii) For absolute-pressure transducers, an absolute pressure of 5 psia.

§ 3175.132 Testing of reference accuracy.

(a) The following reference test conditions must be maintained for the duration of the testing:

(1) Ambient air temperature must be between 59 °F and 77 °F and must not vary over the duration of the test by more than ±2 °F;

(2) Relative humidity must be between 45 percent and 75 percent and must not vary over the duration of the test by more than ±5 percent;

(3) Atmospheric pressure must be between 12.46 psi and 15.36 psi and must not vary over the duration of the test by more than ±0.2 psi;

(4) The transducer must be isolated from any externally induced vibrations;

(5) The transducer must be mounted according to the manufacturer's specifications in the same manner as it would be mounted in normal field operations;

(6) The transducer must be isolated from any external electromagnetic fields; and

(7) For reference accuracy testing of differential-pressure transducers, the downstream side of the transducer must be vented to the atmosphere.

(b) Before reference testing begins, the following pre-conditioning steps must be followed:

(1) After power is applied to the transducer, it must be allowed to stabilize for at least 30 minutes before applying any input pressure or temperature;

(2) The transducer must be exercised by applying three full-range traverses in each direction; and

(3) The transducer must be calibrated according to manufacturer specifications if a calibration is required or recommended by the manufacturer.

(c) Immediately following preconditioning, the transducer must be tested at least three times for accuracy under § 3175.131(h). The results of these tests must be used to determine the transducer's reference accuracy under § 3175.135.

§ 3175.133 Testing of influence effects.

(a) *General requirements.* (1) Reference conditions (see § 3175.132), with the exception of the influence effect being tested under this section, must be maintained for the duration of these tests.

(2) After completing the required tests for each influence effect under this section, the transducer under test must be returned to reference conditions and tested for accuracy under § 3175.132.

(b) *Ambient temperature.* (1) The transducer's accuracy must be tested at the following temperatures (°F): +68, +104, +140, + 68, 0, −4, −40, +68.

(2) The ambient temperature must be held to ±4 °F from each required temperature during the accuracy test at each point.

(3) The rate of temperature change between tests must not exceed 2 °F per minute.

(4) The transducer must be allowed to stabilize at each test temperature for at least 1 hour.

(5) For each required temperature test point listed in this paragraph, the transducer must be tested for accuracy under § 3175.131(h).

(c) *Static-pressure effects (differential-pressure transducers only).* (1) For single-variable transducers, the following pressures must be applied equally to both sides of the transducer, expressed in percent of maximum rated working pressure: 0, 50, 100, 75, 25, 0.

(2) For multivariable transducers, the following pressures must be applied equally to both sides of the transducer, expressed in percent of the URL of the static-pressure transducer: 0, 50, 100, 75, 25, 0.

(3) For each point required in paragraphs (c)(1) and (2) of this section, the transducer must be tested for accuracy under § 3175.131(h).

(d) *Mounting position effects.* The transducer must be tested for accuracy at four different orientations under § 3175.131(h) as follows:

(1) At an angle of −10° from a vertical plane;

(2) At an angle of +10° from a vertical plane;

(3) At an angle of −10° from a vertical plane perpendicular to the vertical plane required in paragraphs (d)(1) and (2) of this section; and

(4) At an angle of +10° from a vertical plane perpendicular to the vertical plane required in paragraphs (d)(1) and (2) of this section.

(e) *Over-range effects.* (1) A pressure of 150 percent of the URL, or to the maximum rated working pressure of the transducer, whichever is less, must be applied for at least 1 minute.

(2) After removing the applied pressure, the transducer must be tested for accuracy under § 3175.131(h).

(3) No more than 5 minutes must be allowed between performing the procedures described in paragraphs (e)(1) and (2) of this section.

(f) *Vibration effects.* (1) An initial resonance test must be conducted by applying the following test vibrations to the transducer along each of the three major axes of the transducer while measuring the output of the transducer with no pressure applied:

(i) The amplitude of the applied test frequency must be at least 0.35mm below 60 Hertz (Hz) and 49 meter per second squared (m/s^2) above 60 Hz; and

(ii) The applied frequency must be swept from 10 Hz to 2,000 Hz at a rate not greater than 0.5 octaves per minute.

(2) After the initial resonance search, an endurance conditioning test must be conducted as follows:

(i) Twenty frequency sweeps from 10 Hz to 2,000 Hz to 10 Hz must be applied to the transducer at a rate of 1 octave per minute, repeated for each of the 3 major axes; and

(ii) The measurement of the transducer's output during this test is unnecessary.

(3) A final resonance test must be conducted under paragraph (f)(1) of this section.

§ 3175.134 Transducer test reporting.

(a) Each test required by §§ 3175.131 through 3175.133 must be fully documented by the test facility performing the tests. The report must indicate the results for each required test and include all data points recorded.

(b) The report must be submitted to the PMT. If the PMT determines that all testing was completed as required by §§ 3175.131 through 3175.133, it will make a recommendation that the BLM approve the transducer make, model, and range, along with the reference uncertainty, influence effects, and any operating restrictions, and posts them to the BLM's website at *www.blm.gov* as an approved device.

§ 3175.135 Uncertainty determination.

(a) Reference uncertainty calculations for each transducer of a given make, model, URL, and turndown must be determined as follows (the result for each transducer is denoted by the subscript i):

(1) *Maximum error* (E_i). The maximum error for each transducer is the maximum difference between any input value from the test device and the corresponding output from the transducer under test for any required test point, and must be expressed in percent of transducer span.

(2) *Hysteresis* (H_i). The testing required in § 3175.132 requires at least

three pairs of tests using both ascending test points (low to high) and descending test points (high to low) of the same value. Hysteresis is the maximum difference between the ascending value and the descending value for any single input test value of a test pair. Hysteresis must be expressed in percent of span.

(3) *Repeatability* (R_i). The testing required under §3175.132 requires at least three pairs of tests using both ascending test points (low to high) and descending test points (high to low) of the same value. Repeatability is the maximum difference between the value of any of the three ascending test points for a given input value or of the three descending test points for a given value. Repeatability must be expressed in percent of span.

(b) *Reference uncertainty of a transducer*. The reference uncertainty of each transducer of a given make, model, URL, and turndown ($U_{r,i}$) must be determined as follows:

$$U_{r,i} = \sqrt{E_i^2 + H_i^2 + R_i^2}$$

Where E_i, H_i, and R_i, are described in paragraph (a) of this section. Reference uncertainty is expressed in percent of span.

(c) Reference uncertainty for the make, model, URL, and turndown of a transducer (U_r) must be determined as follows:

$U_r = \sigma \times t_{dist}$

Where:

σ = the standard deviation of the reference uncertainties determined for each transducer ($U_{r,i}$)

t_{dist} = the ''t-distribution'' constant as a function of degrees of freedom (n-1) and at a 95 percent confidence level, where n = the number of transducers of a specific make, model, URL, and turndown tested (minimum of 5)

(d) *Influence effects*. The uncertainty from each influence effect required to be tested under §3175.133 must be determined as follows:

(1) *Zero-based errors of each transducer*. Zero-based errors from each influence test must be determined as follows:

$$E_{zero,n,i} = \frac{\Delta Z_{n,i}}{span \times M_n} \times 100$$

Where:

subscript i represents the results for each transducer tested of a given make, model, URL, and turndown

subscript n represents the results for each influence effect test required under §3175.133

$E_{zero,n,i}$ = Zero-based error for influence effect n, for transducer i, in percent of span per increment of influence effect

M_n = the magnitude of influence effect n (*e.g.*, 1,000 psi for static-pressure effects, 50 °F for ambient temperature effects)

And:

$\Delta Z_{n,i} = Z_{n,i} - Z_{ref,i}$

Where:

$Z_{n,i}$ = the average output from transducer i with zero input from the test device, during the testing of influence effect n

$Z_{ref,i}$ = the average output from transducer i with zero input from the test device, during reference testing.

(2) *Span-based errors of each transducer*. Span-based errors from each influence effect must be determined as follows:

$$E_{span,n,i} = \left(\frac{S_{n,i} - \Delta Z_{n,i}}{span} - 1 \right) \times \frac{100}{M_n}$$

Where:

$E_{span,n,i}$ = Span-based error for influence effect n, for transducer i, in percent of reading per increment of influence effect

$S_{n,i}$ = the average output from transducer i, with full span applied from the test device, during the testing for influence effect n.

(3) Zero- and span-based errors due to influence effects for a make, model, URL, and turndown of a transducer must be determined as follows:

$E_{z,n} = \sigma_{z,n} \times t_{dist}$

$E_{s,n} = \sigma_{s,n} \times t_{dist}$

Where:

$E_{z,n}$ = the zero-based error for a make, model, URL, and turndown of transducer, for influence effect n, in percent of span per unit of magnitude for the influence effect

$E_{s,n}$ = the span-based error for a make, model, URL, and turndown of transducer, for influence effect n, in percent of reading per unit of magnitude for the influence effect

$\sigma_{z,n}$ = the standard deviation of the zero-based differences from the influence effect tests under § 3175.133 and the reference uncertainty tests, in percent

$\sigma_{s,n}$ = the standard deviation of the span-based differences from the influence effect tests under § 3175.133 and the reference uncertainty tests, in percent

t_{dist} = the ''t-distribution'' constant as a function of degrees of freedom (n-1) and at a 95 percent confidence level, where n = the number of transducers of a specific make, model, URL, and turndown tested (minimum of 5).

§ 3175.140 Flow-computer software testing.

The BLM will approve a particular version of flow-computer software for use in a specific make and model of flow computer only if the testing performed on the software meets all of the standards and requirements in §§ 3175.141 through 3175.144. Type-testing is required for each software version that affects the calculation of flow rate, volume, heating value, live input variable averaging, flow time, or the integral value. Software updates or changes that do not affect these items do not require BLM approval.

§ 3175.141 General requirements for flow-computer software testing.

(a) *Test facility.* All testing must be performed by a qualified test facility not affiliated with the flow-computer manufacturer.

(b) *Selection of flow-computer software to be tested.* (1) Each software version tested must be identical to the software version installed at FMPs for normal field operations.

(2) Each software version must have a unique identifier.

(c) *Testing method.* Input variables may be either:

(1) Applied directly to the hardware registers; or

(2) Applied physically to a transducer. If input variables are applied physically to a transducer, the values received by the hardware registers from the transducer must be recorded.

(d) *Pass-fail criteria.* (1) For each test listed in §§ 3175.142 and 3175.143, the value(s) required to be calculated by the software version under test must be compared to the value(s) calculated by BLM-approved reference software, using the same digital input for both.

(2) The software under test may be used at an FMP only if the difference between all values calculated by the software version under test and the reference software is less than 50 parts per million (0.005 percent) and the results of the tests required in §§ 3175.142 and 3175.143 are satisfactory to the PMT. If the test results are satisfactory, the BLM will identify the software version tested as acceptable for use on its website at *www.blm.gov*.

§ 3175.142 Required static tests.

(a) *Instantaneous flow rate.* The instantaneous flow rates must meet the criteria in § 3175.141(d) for each test identified in Table 1 to this section, using the gas compositions identified in Table 2 to this section, as prescribed in Table 1 to this section.

Table 1 to § 3175.142: Required Inputs for Static Testing

Required Inputs for Static Testing							
Test	Pipe inside diameter (inches)	Orifice diameter (inches)	Differential pressure (inches of water)	Static pressure (psia)	Flowing temperature (° F)	Composition (see Table 2 to § 3175.142)	Static Tap location
1	2.067	0.500	1	15	40	Table 2, Column 1	Up
2		1.500	800	140	80	Table 2, Column 2	Down
3	6.065	1.000	100	1000	-40	Table 2, Column 1	Up
4		4.000	50	500	150	Table 2, Column 1	Down
5	4.026	1.000	100	1000	-40	Table 2, Column 2	Down
6		3.000	50	500	150	Table 2, Column 2	Up

Table 2 to § 3175.142: Required Compositions for Static Testing

Required Compositions for Static Testing		
Component	Composition (mole percent)	
	Composition Column 1	Composition Column 2
Methane	92.0000	76.0000
Ethane	3.3000	8.3000
Propane	1.5000	3.6000
i-Butane	0.4900	0.9000
n-Butane	0.3600	1.5000
i-Pentane	0.4000	1.0000
n-Pentane	0.3000	0.5000
n-Hexane	0.3000	0.8000
n-Heptane	0.2000	0.3000
n-Octane	0.1000	0.2000
n-Nonane	0.0500	0.1000
Carbon dioxide	0.8000	5.3000
Nitrogen	0.2000	1.4000
Helium	0.0000	0.0500
Oxygen	0.0000	0.0300
Hydrogen sulfide	0.0000	0.0200

(b) *Sums and averages.* (1) Fixed input values from test 2 in Table 1 to this section must be applied for a period of at least 24 hours.

(2) At the conclusion of the 24-hour period, the following hourly and daily values must meet the criteria in § 3175.141(d):

(i) Volume;

(ii) Integral value;

(iii) Flow time;

(iv) Average differential pressure;

(v) Average static pressure; and

(vi) Average flowing temperature.

(c) *Other tests.* The following additional tests must be performed on the flow-computer software:

(1) Each parameter of the configuration log must be changed to ensure the event log properly records the changes according to the variables listed in § 3175.104(c); and

(2) Inputs simulating a 15 percent and 150 percent over-range of the differential and static-pressure transducer's calibrated span must be entered to verify that the over-range condition triggers an alarm or an entry in the event log.

§ 3175.143 Required dynamic tests.

(a) *Square wave test.* The pressures and temperatures must be applied to the software revision under test for at least 60 minutes as follows:

(1) *Differential pressure.* The differential pressure must be cycled from a low value, below the no-flow cutoff, to a

high value of approximately 80 percent of the upper calibrated limit of the differential-pressure transducer. The cycle must approximate a square wave pattern with a period of 60 seconds, and the maximum and minimum values must be the same for each cycle;

(2) *Static pressure.* The static pressure must be cycled between approximately 20 percent and approximately 80 percent of the upper calibrated limit of the static-pressure transducer in a square wave pattern identical to the cycling pattern used for the differential pressure. The maximum and minimum values must be the same for each cycle;

(3) *Temperature.* The temperature must be cycled between approximately 20 °F and approximately 100 °F in a square wave pattern identical to the cycling pattern used for the differential pressure. The maximum and minimum values must be the same for each cycle; and

(4) At the conclusion of the 1-hour period, the following hourly values must meet the criteria in § 3175.141(d):

(i) Volume;

(ii) Integral value;

(iii) Flow time;

(iv) Average differential pressure;

(v) Average static pressure; and

(vi) Average flowing temperature.

(b) *Sawtooth test.* The pressures and temperatures must be applied to the software revision under test for 24 hours as follows:

(1) *Differential pressure.* The differential pressure must be cycled from a low value, below the no-flow cutoff, to a high value of approximately 80 percent of the maximum value of differential pressure for which the flow computer is designed. The cycle must approximate a linear sawtooth pattern between the low value and the high value and there must be 3 to 10 cycles per hour. The no-flow period between cycles must last approximately 10 percent of the cycle period;

(2) *Static pressure.* The static pressure must be cycled between approximately 20 percent and approximately 80 percent of the maximum value of static pressure for which the flow computer is designed. The cycle must approximate a linear sawtooth pattern between the low value and the high value and there must be 3 to 10 cycles per hour;

(3) *Temperature.* The temperature must be cycled between approximately 20 °F and approximately 100 °F. The cycle should approximate a linear sawtooth pattern between the low value and the high value and there must be 3 to 10 cycles per hour; and

(4) At the conclusion of the 24-hour period, the following hourly and daily values must meet the criteria in § 3175.141(d):

(i) Volume;

(ii) Integral value;

(iii) Flow time;

(iv) Average differential pressure;

(v) Average static pressure; and

(vi) Average flowing temperature.

(c) *Random test.* The pressures and temperatures must be applied to the software revision under test for 24 hours as follows:

(1) *Differential pressure.* Differential-pressure random values must range from a low value, below the no-flow cutoff, to a high value of approximately 80 percent of the upper calibrated limit of the differential-pressure transducer. The no-flow period between cycles must last for approximately 10 percent of the test period;

(2) *Static pressure.* Static-pressure random values must range from a low value of approximately 20 percent of the upper calibrated limit of the static-pressure transducer, to a high value of approximately 80 percent of the upper calibrated limit of the static-pressure transducer;

(3) *Temperature.* Temperature random values must range from approximately 20 °F to approximately 100 °F; and

(4) At the conclusion of the 24-hour period, the following hourly values must meet the criteria in § 3175.141(d):

(i) Volume;

(ii) Integral value;

(iii) Flow time;

(iv) Average differential pressure;

(v) Average static pressure; and

(vi) Average flowing temperature.

(d) *Long-term volume accumulation test.* (1) Fixed inputs of differential pressure, static pressure, and temperature must be applied to the software version under test to simulate a flow rate greater than 500,000 Mcf/day for a period of at least 7 days.

(2) At the end of the 7-day test period, the accumulated volume must meet the criteria in § 3175.141(d).

§ 3175.144 Flow-computer software test reporting.

(a) The test facility performing the tests must fully document each test required by §§ 3175.141 through 3175.143. The report must indicate the results for each required test and include all data points recorded.

(b) The report must be submitted to the AO by the operator or the manufacturer. If the PMT determines all testing was completed as required by this section, it will make a recommendation that the BLM approve the software version and post it on the BLM's website at *www.blm.gov* as approved software.

§ 3175.150 Immediate assessments.

(a) Certain instances of noncompliance warrant the imposition of immediate assessments upon discovery. Imposition of any of these assessments does not preclude other appropriate enforcement actions.

(b) The BLM will issue the assessments for the violations listed as follows:

Table 1 to § 3175.150: Violations Subject to an Immediate Assessment

Violations Subject to an Immediate Assessment	
Violation:	Assessment amount per violation:
1. New FMP orifice plate inspections were not conducted as required by § 3175.80(c).	$1,000
2. Routine FMP orifice plate inspections were not conducted as required by § 3175.80(d).	$1,000
3. Basic meter-tube inspections were not conducted as required by § 3175.80(h).	$1,000
4. Detailed meter-tube inspections were not conducted as required by § 3175.80(i).	$1.000
5. An initial mechanical-recorder verification was not conducted as required by § 3175.92(a).	$1,000
6. Routine mechanical-recorder verifications were not conducted as required by § 3175.92(b).	$1,000
7. An initial EGM-system verification was not conducted as required by § 3175.102(a).	$1,000
8. Routine EGM-system verifications were not conducted as required by § 3175.102(b).	$1,000
9. Spot samples for low-volume and very-low-volume FMPs were not taken as required by § 3175.115(a).	$1,000
10. Spot samples for high- and very-high-volume FMPs were not taken as required by § 3175.115(a) and (b).	$1,000

APPENDIX A TO SUBPART 3175—TABLE OF ATMOSPHERIC PRESSURES

Elevation (ft msl)	Atmos. Pressure (psi)	Elevation (ft msl)	Atmos. Pressure (psi)	Elevation (ft msl)	Atmos. Pressure (psi)
0	14.70	**4,000**	12.70	**8,000**	10.92
100	14.64	4,100	12.65	8,100	10.88
200	14.59	4,200	12.60	8,200	10.84
300	14.54	4,300	12.56	8,300	10.80
400	14.49	4,400	12.51	8,400	10.76
500	14.43	4,500	12.46	8,500	10.72
600	14.38	4,600	12.42	8,600	10.68
700	14.33	4,700	12.37	8,700	10.63
800	14.28	4,800	12.32	8,800	10.59
900	14.23	4,900	12.28	8,900	10.55
1,000	14.17	**5,000**	12.23	**9,000**	10.51
1,100	14.12	5,100	12.19	9,100	10.47
1,200	14.07	5,200	12.14	9,200	10.43
1,300	14.02	5,300	12.10	9,300	10.39
1,400	13.97	5,400	12.05	9,400	10.35
1,500	13.92	5,500	12.01	9,500	10.31
1,600	13.87	5,600	11.96	9,600	10.27
1,700	13.82	5,700	11.92	9,700	10.23
1,800	13.77	5,800	11.87	9,800	10.19
1,900	13.72	5,900	11.83	9,900	10.15
2,000	13.67	**6,000**	11.78	**10,000**	10.12
2,100	13.62	6,100	11.74	10,100	10.08
2,200	13.57	6,200	11.69	10,200	10.04
2,300	13.52	6,300	11.65	10,300	10.00
2,400	13.47	6,400	11.61	10,400	9.96
2,500	13.42	6,500	11.56	10,500	9.92
2,600	13.37	6,600	11.52	10,600	9.88
2,700	13.32	6,700	11.48	10,700	9.84
2,800	13.27	6,800	11.43	10,800	9.81
2,900	13.22	6,900	11.39	10,900	9.77
3,000	13.17	**7,000**	11.35	**11,000**	9.73
3,100	13.13	7,100	11.30	11,100	9.69
3,200	13.08	7,200	11.26	11,200	9.65
3,300	13.03	7,300	11.22	11,300	9.62
3,400	12.98	7,400	11.18	11,400	9.58
3,500	12.93	7,500	11.13	11,500	9.54

3,600	12.89	7,600	11.09	11,600	9.50
3,700	12.84	7,700	11.05	11,700	9.47
3,800	12.79	7,800	11.01	11,800	9.43
3,900	12.74	7,900	10.97	11,900	9.39

ft msl = feet above mean sea level

Calculated as:

$$P_{atm} = 14.696 \times (1 - 0.00000686E)^{5.25577}$$

Where:

P_{atm} is atmospheric pressure, psi
E is meter elevation, feet above mean sea level

From: U.S. Standard Atmosphere, 1976, U.S. Government Printing Office, Washington, D.C., 1976.

Subpart 3178—Royalty-Free Use of Lease Production

SOURCE: 81 FR 83078, Nov. 18, 2016, unless otherwise noted.

§ 3178.1 Purpose.

The purpose of this subpart is to address the circumstances under which oil or gas produced from Federal and Indian leases may be used royalty-free in operations on the lease, unit, or communitized area. This subpart supersedes those portions of Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases, Royalty or Compensation for Oil or Gas Lost (NTL–4A), pertaining to oil or gas used for beneficial purposes.

§ 3178.2 Scope.

(a) This subpart applies to:

(1) All onshore Federal and Indian (other than Osage Tribe) oil and gas leases, units, and communitized areas, except as otherwise provided in this subpart;

(2) Indian Mineral Development Act (IMDA) oil and gas agreements, unless specifically excluded in the agreement or unless the relevant provisions of this subpart are inconsistent with the agreement;

(3) Leases and other business agreements and contracts for the development of tribal energy resources under a Tribal Energy Resource Agreement entered into with the Secretary, unless specifically excluded in the lease, other business agreement, or Tribal Energy Resource Agreement;