

Proposed revision to: RULES OF PROCEDURE FOR NORTHWEST NEW MEXICO

CHAPTER I TYPE OF TESTS REQUIRED FOR WELLS COMPLETED IN PRORATED GAS POOLS

BEFORE THE	
OIL CONSERVATION COMMISSION	
Santa Fe, New Mexico	
Case No. <u>10/05</u>	Exhibit No. <u>1</u>
Submitted by <u>C. J. J. J.</u>	
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Section 1. Reclassified GPUs

Operators of wells on a Gas Proration Unit (GPU) which has been reclassified as non-marginal will conduct Deliverability tests on those wells within 90 days of the order reclassifying it unless there are current tests on file with the Oil Conservation Division (Division) or the order requires a new test. A current test is a test which was conducted during the last test period for that pool or later.

Section 2. Non-marginal GPUs

Operators will conduct deliverability tests on wells on non-marginal GPUs every five years. If the Division determines that a well's test data and production data warrant more frequent testing of a well the Division may set up special testing schedules for that well.

Section 3 Scheduling of testing

By September 1 of each year the Aztec District Office of the Division will notify operators of non-marginal GPUs that their wells will be tested during the following test period.

All Deliverability Tests required by these rules must be filed with the Division's Aztec office within 90 days following the completion of each test. Provided however, that any test completed between December 31 of the test year and March 10 of the following year are due no later than January 31. No extension of time for filing tests beyond March 10 will be granted except after notice and hearing.

Failure to file any test within the above-prescribed times will subject the GPU to the loss of one day's allowable for each day the test is late.

Any well scheduled for testing during its test year may have the conditioning period, test flow period, and part of the seven-day shut-in period conducted in December of the previous year provided that if the seven-day shut-in period immediately follows the test flow period the seven-day shut-in pressure would be measured in January of the test year. The earliest date that a well could be scheduled for a Deliverability Test would be such that the Test Flow Period would end on December 25 of the previous year.

Downhole commingled wells are to be scheduled for tests on dates for pool of the lowermost prorated completion of the well.

In the event a well is shut-in by the Division for overproduction, the operator may produce the well for a period of time to secure a test after written notification to the Division. All gas

produced during this testing period will be used in determining the over/under produced status of the well.

An operator may schedule a well for a deliverability retest upon notification to the Division's Aztec office at least ten days before the test is to be commenced. Such retest will be for substantial reason and will be subject to the approval of the Division. A retest will be conducted in conformance with the Deliverability Test Procedures of these rules. The Division, at its discretion, may require the retesting of any well by notification to the operator to schedule such retest. These tests as filed on Form C-122A should be identified as "RETEST" in the remarks column.

Section 4: WITNESSING OF TESTS

Any Deliverability Test may be witnessed by any or all of the following: an agent of the Division, an offset operator, a representative of the gas transportation facility connected to the well under test, or a representative of the gas transportation facility taking gas from an offset operator.

CHAPTER II: DELIVERABILITY TEST PROCEDURE

This test will begin by producing a well in the normal operating manner into the pipeline through either the casing or tubing, but not both, for a period of fourteen consecutive days. This will be known as the conditioning period. The production valve and choke settings will not be changed during either the conditioning or flow periods except during the first ten (10) days of the conditioning period when maximum production would over-range the meter chart or location production equipment. The first ten (10) days of said conditioning period will not have more than forty eight (48) hours of cumulative interruptions of flow. The eleventh to fourteenth day, inclusive, of said conditioning period will have no interruptions of flow whatsoever. Any interruption of flow that occurs as normal operation of the well such as stopcock flow, intermittent flow, or well blow down will not be counted as shut-in time in either the conditioning or flow period.

The daily flowing rate will be determined from an average of seven or eight consecutive producing days, following a minimum conditioning period of 14 consecutive days of production. This will be known as the flow period.

Instantaneous pressures will be measured by deadweight gauge or other method approved by the Division during the 7-day or 8-day flow period at the casinghead, tubinghead, or orifice meter, and will be recorded along with the instantaneous meter-chart static pressure reading.

If a well is producing through a compressor that is located between the wellhead and the meter run, the meter run pressure and the wellhead casing pressure and the wellhead tubing pressures are to be reported on Form C-122A. (Neither the suction pressure nor the discharge pressure of the compressor is considered wellhead pressure.) A note will be entered in the remarks portion on Form

C-122A stating "This well produces through a compressor."

When it is necessary to restrict the flow of gas between the wellhead and orifice meter, the ratio of the downstream pressure, psia, to the upstream pressure, psia will be determined. When this ratio is 0.57, or less, critical flow conditions will be considered to exist across the restriction.

When more than one restriction between the wellhead and orifice meter causes the pressures to reflect critical flow between the wellhead and orifice meter, the pressures across each of these restrictions will be measured to determine whether critical flow exists at any restriction. When critical flow does not exist at any restriction, the pressures taken to disprove critical flow will be reported to the Division on Form C-122A in item (n) of the form. When critical flow conditions exist, the instantaneous flowing pressures required hereinabove will be measured during the last 48 hours of the 7-day or 8-day flow period.

When critical flow exists between the wellhead and orifice meter, the measured wellhead flowing pressure of the string through which the well flowed during the test will be used as P_i when calculating the static wellhead working pressure (P_w) using the method established below.

When critical flow does not exist at any restriction, P_i will be the corrected average static pressure from the meter chart plus friction loss from the wellhead to the orifice meter.

The static wellhead working pressure (P_w) of any well under test will be the calculated 7-day or 8-day average static tubing pressure if the well is flowing through the casing; it will be the calculated 7-day or 8-day average static casing pressure if the well is flowing through the tubing. The static wellhead working pressure (P_w) will be calculated by applying the tables and procedures set out in this manual.

To obtain the shut-in pressure of a well under test, the well will be shut in some time during the current testing season for a period of seven to fourteen consecutive days, which have been preceded by a minimum of seven days of uninterrupted production. The shut-in pressure will be measured with a deadweight gauge or other method approved by the Division on the seventh to fourteenth day of shut-in of the well. The 7-day shut-in pressure will be measured on both the tubing and the casing when communication exists between the two strings. The higher of such pressures will be used as P_c in the deliverability calculation. When any such shut-in pressure is determined by the Division to be abnormally low or the well cannot be shut-in due to "HARDSHIP" classification, the shut-in pressure to be used as P_c will be determined by one of the following methods:

1. A Division-designated value.
2. An average shut-in pressure of all offset wells completed in the same zone. Offset wells include the four side and four corner wells, if available.
3. A calculated surface pressure based on a calculated bottom-hole pressure. Such calculation will be made in accordance with the examples in this manual.

All wellhead pressures as well as the flowing meter pressure tests which are to be taken during the

7-day or 8-day deliverability test period as required hereinabove will be taken with a deadweight gauge or other method approved by the Division. The pressure readings and the date and time according to the chart will be recorded and maintained in the operator's records with the test information.

Orifice meter charts will be changed and so arranged as to reflect upon a single chart the flow data for the gas from each well for the full 7-day or 8-day deliverability test period; however, no tests will be voided if satisfactory explanation is made as to the necessity for using test volumes through two chart periods. Corrections will be made for pressure base, measured flowing temperature, specific gravity, and supercompressibility; provided however, if the specific gravity of the gas from any well under test is not available, an estimated specific gravity may be assumed therefor, based upon that of gas from nearby wells, the specific gravity of which has been actually determined by measurement.

The average flowing meter pressure for the 7-day or 8-day flow period and the corrected integrated volume will be determined by the purchasing company that integrates the flow charts and furnished to the operator or testing agency.

The 7-day or 8-day flow period volume will be calculated from the integrated readings as determined from the flow period orifice meter chart. The volume so calculated will be divided by the number of testing days on the chart to determine the average daily rate of flow during said flow period. The flow period will have a minimum of seven and maximum of eight legibly recorded flowing days to be acceptable for test purposes. The volume used in this calculation will be corrected to New Mexico Oil Conservation Division standard conditions of 15.025 psia pressure base, 60°F. temperature base and 0.60 specific gravity base.

The daily volume of flow as determined from the flow period chart readings will be calculated by applying the Basic Orifice Meter Formula or other acceptable industry standard practices.

$$Q = C' (h_w P_f)^{.5}$$

Where:

Q = Metered volume of flow Mcf/d @ 15.025 psia, 60°F., and 0.60 specific gravity

C' = The 24-hour basic orifice meter flow factor corrected for flowing temperature, gravity and supercompressibility.

h_w = Daily average differential meter pressure from flow period chart.

P_f = Daily average flowing meter pressure from flow period chart.

The basic orifice meter flow factors, flowing temperature factor, and specific gravity factor will be determined from the tables in this manual.

The daily flow period average corrected flowing meter pressure, psig, will be used to determine the

supercompressibility factor. Supercompressibility Tables may be obtained from the New Mexico Oil Conservation Division.

When supercompressibility correction is made for a gas containing either nitrogen or carbon dioxide in excess of 2 percent, the supercompressibility factors of such gas will be determined by the use of Table V of the C.N.G.A. Bulletin TS-402 for pressures 100-500 psig, or Table II, TS-461 for pressures in excess of 500 psig.

The use of tables for calculating rates of flow from integrator readings which do not specifically conform to the New Mexico Oil Conservation Division "Back Pressure Test Manual," or this manual, may be approved for determining the daily flow period rates of flow upon a showing that such tables are appropriate and necessary.

The daily average integrated rate of flow for the 7-day or 8-day flow period will be corrected for meter error by multiplication by a correction factor. The correction factor will be determined by dividing the square root of the deadweight flowing meter pressure, psia, by the square root of the chart flowing meter pressure, psia.

Deliverability pressure, as used herein, is a defined pressure applied to each well and used in the process of comparing the abilities of wells in a pool to produce at static wellhead working pressures equal to a fixed pressure or a percentage of the 7-day shut-in pressure of the respective individual wells. Such fixed pressure or percentage will be determined and announced periodically by the Division based on the relationship of the average static wellhead working pressures (P_w) divided by the average 7-day shut-in pressure (P_c) of the pool.

The deliverability of gas at the "deliverability pressure" of any well under test will be calculated from the test data derived from the tests hereinabove required by use of the following deliverability formula:

$$D = Q \left[\frac{(P_c^2 - P_d^2)}{(P_c^2 - P_w^2)} \right]^n$$

Where:

D = Deliverability Mcf/d at the deliverability pressure, (P_d), (at Standard Conditions of 15.025 psia, 60°F and 0.60 sp. gr.).

Q = Daily flow rate in Mcf/d, at wellhead pressure (P_w).

P_c = 7-day shut-in Wellhead pressure, psia, determined in accordance with Section 2 of Chapter II.

P_d = Deliverability pressure, psia, as defined above.

P_w = Average static wellhead working pressure, as determined from 7-day or 8-day flow period,

psia, and calculated from tables in this manual entitled "Pressure Loss Due to Friction" Tables for northwest New Mexico.

n = Average pool slope of back pressure curves as follows:

For Pictured Cliffs and shallower formations 0.85

For formations deeper than Pictured Cliffs 0.75

(Note: Special rules for any specific pool or formation may supersede the above values. Check special rules if in doubt.

The value of the multiplier in the above formula (ratio factor after the application of the pool slope) by which Q is multiplied will not exceed a limiting value to be determined and announced periodically by the Division. Such determination will be made after a study of the test data of the pool obtained during the previous testing season.

Downhole commingled wells are to be tested in year for pool of lowermost prorated completion of the well and will use the pool slope (n), and deliverability pressure of lowermost prorated pool. The total flow rate from the downhole commingled well will be used to calculate a value of deliverability. For each prorated gas zone of a downhole commingled well, a Form C-122A is required to be filed and in the Summary portion of that form, all zones will indicate the same data for line h , P_c , Q , P_w , and P_d . The value shown for Deliverability (D) will be that percentage of the total deliverability of the well that is applicable to this zone. A note will be placed in the remarks column that indicates the percentage of deliverability to be allocated to this zone of the well.

Any test prescribed herein will be considered acceptable if the average flow rate for the final 7-day or 8-day deliverability test is not more than 10 percent in excess of any consecutive 7-day or 8-day average of the preceding two weeks. A deliverability test not meeting this requirement may be declared invalid, requiring the well to be re-tested.

All charts relative to deliverability tests or copies thereof will be made available to the Division upon its request.

All testing agencies, whether individuals, companies, pipeline companies, or operators, will maintain a log of all tests accomplished by them including all field test data. The operator will maintain the above data for a period of not less than two (2) years plus the current test year.

All forms heretofore mentioned are hereby adopted for use in the northwest New Mexico Area in open form subject to such modification as experience may indicate desirable or necessary.

Deliverability Tests for gas wells in all formations will be conducted and reported in accordance with these rules and procedures. Provided however, these rules will be subject to any specific modification or change contained in Special Pool Rules adopted for any pool after notice and hearing.

CHAPTER III: INFORMATIONAL TESTS

A one-point back pressure test may be taken on newly completed wells before their connection or reconnection to a gas transportation facility. This test will not be a required official test but may be taken for informational purposes at the option of the operator. When taken, this test must be taken and reported as prescribed below:

ONE-POINT BACK PRESSURE POTENTIAL TEST PROCEDURE

This test will be accomplished after a minimum shut-in of seven days. The shut-in pressure will be measured with a deadweight gauge or other method approved by the Division.

The flow rate will be that rate in Mcf/d measured at the end of a three hour test flow period. The flow from the well will be for three hours through a positive choke, which has a 3/4-inch orifice.

A 2-inch nipple which provides a mechanical means of accurately measuring the pressure and temperature of the flowing gas will be installed immediately upstream from the positive choke.

The absolute open flow will be calculated using the conventional back pressure formula as shown in this manual or the New Mexico Oil Conservation Division "Back Pressure Test Manual."

The observed data and flow calculations will be reported in duplicate on Form C-122, "Multi-Point Back Pressure Test for Gas Wells."

Non-critical flow will be considered to exist when the choke pressure is 13 psig or less. When this condition exists the flow rate will be measured with a pitot tube and nipple as specified in this manual or in the Division's Manual of "Tables and Procedure for Pitot Tests." The pitot test nipple will be installed immediately downstream from the 3/4-inch positive choke.

Any well completed with 2-inch nominal size tubing (1.995-inch ID) or larger will be tested through the tubing.

Other tests for informational purposes may be conducted prior to obtaining a pipeline connection for a newly completed well upon receiving specific approval therefor from the Division's Aztec office. Approval of these tests will be based primarily upon the volume of gas to be vented.