606 TESTS AND TEST PROCEDURES FOR PRORATED POOLS IN NORTHWEST NEW MEXICO

606.A. TYPE OF TESTS REQUIRED FOR WELLS COMPLETED IN PRORATED GAS POOLS

(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. [5-15-98]

(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. [5-15-98]

(3) Scheduling of Tests

(a) Notification of Pools to be Tested: By September 1 of each year the Aztec District Office of the Division will notify operators of non-marginal GPUs if their wells will be tested during the following test period. [5-15-98]

(b) 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. [5-15-98]

(c) 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. [5-15-98]

(d) 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. [5-15-98]

(e) Downhole commingled wells are to be scheduled for tests on dates for the pool of the lowermost prorated completion of the well. [5-15-98]

(f) 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. [5-15-98]

(g) 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. [5-15-98]

(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. [5-15-98]

606.B. PROCEDURE FOR TESTING

(1) The test shall 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 shall be known as the conditioning period. The production valve and choke settings shall 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 shall not have more than forty-eight (48) hours of cumulative interruptions of flow. The eleventh to fourteenth days, inclusive of said conditioning period, shall have no interruptions of flow whatsoever. Any interruption of flow that occurs as normal operation of the well as stop-cock flow, intermittent flow, or well blow down will not be counted as shut-in time in either the conditioning or flow period. [5-15-98]

(2) The daily flowing rate shall be determined from an average of seven or eight consecutive producing days, following a minimum conditioning period of 14 consecutive days of production. This shall be known as the flow period. [5-15-98]

(3) Instantaneous pressure shall be measured by a deadweight gauge or other method approved by the Division during the seven-day or eight-day flow period at the casinghead, tubinghead, and orifice meter, and shall be recorded along with instantaneous meter-chart static pressure reading. [5-15-98]

(4) 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 pressure 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 shall be entered in the remarks portion on Form C-122A stating "This well produced through a compressor". [5-15-98]

(5) When it is necessary to restrict the flow of gas between the wellhead and the orifice meter, the ratio of the downstream pressure, psia, to the upstream pressure, psia, shall be determined. When this ratio is 0.57, or less, critical flow conditions shall be considered to exist across the restriction. [5-15-98]

(6) When more than one restriction between the wellhead and the orifice meter causes the pressures to reflect critical flow between the wellhead and the orifice meter, the pressures across each of these restrictions shall 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 the critical flow shall 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 shall be measured during the last 48 hours of the seven-day or eight-day flow period. [5-15-98]

(7) When critical flow exists between the wellhead and the orifice meter, the measured wellhead flowing pressure of the string through which the well flowed during the test shall be used as P_t when calculating the static wellhead working pressure (P_w) using the method established below. [5-15-98]

(8) When critical flow does not exist at any restriction, P_t shall be the corrected average static pressure from the meter chart plus friction loss from the wellhead to the orifice meter. [5-15-98]

(9) The static wellhead working pressure (P_w) of any well under test shall be the calculated seven-day or eight-day average static tubing pressure if the well is flowing through the casing; it shall be the calculated seven-day or eight-day average static casing pressure if the well is flowing through the tubing. The static wellhead working pressure (P_w) shall be calculated by applying the tables and procedures set out in this manual. [5-15-98]

(10) To obtain the shut-in pressure of a well under test, the well shall 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. Such shut-in pressure shall 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 seven-day shut-in pressure shall be measured on both the tubing and the casing when communication exists between the two strings. The higher of such pressures shall 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 can not be shut-in due to "HARDSHIP" classification, the shut-in pressure to be used as P_c shall be determined by one of the following methods:

(a) A Division-designated value.

(b) 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.

(c) A calculated surface pressure based on a calculated bottom-hole pressure. Such calculations shall be made in accordance with the examples in this manual. [5-15-98]

(11) All wellhead pressures, as well as the flowing meter pressure tests which are to be taken during the seven-day or eight-day deliverability test period as required hereinabove, shall 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 shall be recorded and maintained in the operator's records with the test information. [5-15-98]

(12) Orifice meter charts shall be changed and arranged so as to reflect upon a single chart the flow data for the gas from each well for the full seven-day or eight-day deliverability test period; however, no tests shall be voided if satisfactory explanation is made as to the necessity for using test volumes through two chart periods. Corrections shall 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 therefore, based upon that of gas from near-by wells, the specific gravity of which has been actually determined by measurement. [5-15-98]

(13) The average flowing meter pressure for the seven-day or eight-day flow period and the corrected integrated volume shall be determined by the purchasing company that integrates the flow charts and furnished to the operator or testing agency. [5-15-98]

(14) The seven-day or eight-day flow period volume shall be calculated from the integrated readings as determined from the flow period orifice meter chart. The volume so calculated shall 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 shall have a minimum of seven and a maximum of eight legibly recorded flowing days to be acceptable for test purposes. The volume used in this calculation shall 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. [5-15-98]

(15) The daily volume of flow, as determined from the flow period chart readings, shall 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. [5-15-98]

(16) The basic orifice meter flow factors, flowing temperature factor, and specific gravity factor shall be determined from the tables in this manual. [5-15-98]

(17) The daily flow period average corrected flowing meter pressure, psig, shall be used to determine the supercompressibility factor. Supercompressibility Tables may be obtained from the New Mexico Oil Conservation Division. [5-15-98]

(18) When supercompressibility correction is made for a gas containing either nitrogen or carbon dioxide in excess of two percent, the supercompressibility factors of such gas shall 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. [5-15-98]

(19) 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. [5-15-98]

(20) The daily average integrated rate of flow for the seven-day or eight-day flow period shall be corrected for meter error by multiplication by a correction factor. Said correction factor shall 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. [5-15-98]

(21) 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 percentage of the seven-day shut-in pressure of the respective individual wells. Such percentage shall 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 seven-day shut-in pressure (Pc) of the pool. [5-15-98]

(22) The deliverability of gas at the "deliverability pressure" of any well under test shall 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 = Seven-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 seven-day or eight-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.) [5-15-98]

(23) The value of the multiplier in the above formula (ratio factor after the application of the pool slope) by which Q is multiplied shall not exceed a limiting value to be determined and announced periodically by the Division. Such determination shall be made after a study of the test data of the pool obtained during the previous testing season. [5-15-98]

(24) Downhole commingled wells are to be tested in the test year for the pool of the lowermost prorated completion of the well and shall use pool slope (n), and deliverability pressure of the lowermost 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. Also, 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 shall be placed in the remarks column that indicates the percentage of deliverability to be allocated to this zone of the well. [5-15-98]

(25) Any test prescribed herein will be considered acceptable if the average flow rate for the final seven-day or eight-day deliverability test is not more than ten percent in excess of any consecutive seven-day or eight-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. [5-15-98]

(26) All charts relative to ~~initial, annual, or biennial~~ deliverability tests or copies thereof shall be made available to the Division upon its request. [5-15-98]

(27) All testing agencies, whether individuals, companies, pipeline companies, or operators, shall maintain a log of all tests accomplished by them including all field test data. The operator shall maintain the above data for a period of not less than two (2) years plus the current test year. [5-15-98]

(28) All forms heretofore mentioned are hereby adopted for use in the northwest New Mexico area in open form subject to such mnodification as experience may indicate desirable or necessary. [5-15-98]

(29) Deliverability Tests for gas wells in all formations shall be conducted and reported in accordance with these rules and procedures. Provided, however, these rules shall be subject to any specific modification or change contained in Special Pool Rules adopted for any pool after notice and hearing. [5-15-98]

606.C. INFORMATIONAL TESTS

(1) One-Point Back Pressure Test: 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 shall 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.

(2) Test Procedure

(a) This test shall be accomplished after a minimum shut-in of seven days. The shut-in pressure shall be measured with a deadweight gauge or other method approved by the Division. [5-15-98]

(b) The flow rate shall be that rate in Mcf/d measured at the end of a three hour test flow period. The flow from the well shall be for three hours through a positive choke, which has a 3/4 inch orifice. [5-15-98]

(c) A 2-inch nipple which provides a mechanical means of accurately measuring the pressure and temperature of the flowing gas shall be installed immediately upstream from the positive choke. [5-15-98]

(d) The absolute open flow shall be calculated using the conventional back pressure formula as shown in this manual or the New Mexico Oil Conservation Division "Back Pressure Test Manual." [5-15-98]

(e) The observed data and flow calculations shall be reported in duplicate on Form C-122, "Multi-Point Back Pressure Test for Gas Wells." [5-15-98]

(f) Non-critical flow shall be considered to exist when the choke pressure is 13 psig or less. When this condition exists the flow rate shall 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 shall be installed immediately downstream from the 3/4-inch positive choke. [5-15-98]

(g) Any well completed with 2-inch nominal size tubing (1.995-inch ID) or larger shall be tested through the tubing. [5-15-98]

(3) Other tests for informational purposes may be conducted prior to obtaining a pipeline connection for a newly completed well upon receiving specific approval therefore from the Division's Aztec office. Approval of these tests shall be based primarily upon the volume of gas to be vented. [5-15-98]