

## 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  $P_i$  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,  $P_i$  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 ( $P_c$ ) 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 modification 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]

**606 TESTS AND TEST RULES OF PROCEDURES FOR PRORATED POOLS IN  
NORTHWEST NEW MEXICO** From R-333 as amended

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

SECTION 1-(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. [5-15-97] Initial Deliverability and Shut In Pressure Tests for Newly Completed Well

~~A. Immediately upon completion of each gas well in northwest New Mexico, a shut in pressure test of at least seven days duration shall be made. This initial shut in pressure shall be filed with the Division's Aztec Office on either Form C-122 or C-104.~~

~~B. Within 90 days after a well first delivers gas to a gas transportation facility, the well shall have been tested in accordance with Section 1 of Chapter II of these rules, "Initial Deliverability and Shut In Pressure Test Procedures," and the results of the test filed in triplicate with the Division's Aztec office and one copy filed with the gas transportation facility to which the well is connected. This test is to be filed on Form C-122A. Failure to file said test within the above-prescribed 90-day period will subject the well to the loss of one day's allowable for each day the test is late.~~

~~1. If the newly first delivered well is an infill well on a proration unit, the old well on the unit is not required to be tested provided it has a valid test on file for the current proration year. Testing of the old well follows the regularly assigned test year for the pool in which the wells are located. The new well is required to be tested annually until at least three annual tests are on file and then the well is to be tested biennially with other wells in that pool.~~

~~2. If the newly first delivered well is an infill well on a proration unit and the old well on the unit is "exempt," the old well is to be tested along with the new well for the Initial and Annual Deliverability and Shut In Pressure Test. The old well will lose its "exempt" classification pool. The new infill well is required to be tested annually until at least three annual tests are on file and then the well is to be tested biennially with other wells in that pool.~~

~~C. The requirements for Initial Tests and Annual or Biennial Deliverability and Shut In Pressure Tests and the notification requirements and scheduling of such tests which apply to newly completed wells shall also apply to recompleted wells.~~

~~D. Any tests taken for informational purposes prior to pipeline connection shall not be recognized as official tests for the assignment of allowables.~~

SECTION 2.(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] Annual and Biennial Deliverability and Shut In Pressure Tests

~~Annual or Biennial Deliverability and Shut In Pressure Tests shall be made on all gas wells during the period from January 1 through December 31 of that year except as follows:~~

~~1. A newly completed well or a recompleted well shall be tested on an annual basis until a minimum of three annual tests have been taken, after which the well shall be tested biennially as is required for other wells in the pool in which the well is located.~~

~~2. Wells classified as "exempt" shall not be subject to the requirements of annual or biennial deliverability tests.~~

~~Classification of wells into or out of the "exempt" status shall be done once each year immediately following the reporting of June production and shall be effective for the succeeding annual test period.~~

~~Gas wells completed in the Pictured Cliffs or any shallower formation shall be classified "exempt" if at least three months of production history is available and the well failed to produce, and is incapable of producing, an average volume equal to the larger of 1) the pool's current (April-September) Monthly Acreage Allocate Factor, F1, times the GPU Acreage Factor, A, or 2) an average of 250 MCF or more per month during the months produced within the preceding 12-month period, and the well is classified as marginal in the August Gas Proration Schedule.~~

~~Gas wells completed in any formation deeper than the Pictured Cliffs formation shall be classified "exempt" if at least three months of production history is available and the well failed to produce, and is incapable of producing, an average volume equal to the larger of 1) the pool's current (April-September) Monthly Acreage Allocate Factor, F1, times the GPU Acreage Factor, A, or 2) an average of 2000 MCF or more per month during the months produced within the preceding 12-month period, and the well is classified as marginal in the August Gas Proration Schedule.~~

~~Gas wells on multiple well Gas Proration Units will not be classified "exempt" unless the Gas Proration Unit is classified as marginal. Any or all wells on a marginal multiple well Gas Proration Unit may be classified as "exempt" provided each Gas Proration Unit so classified meets the qualification for "exempt" status. Gas Proration Units for wells producing from formations deeper than the Pictured Cliffs formation shall be classified "exempt" if at least three months of production history is available and the Gas Proration Unit failed to produce, and is incapable of producing, an average volume equal to the larger of 1) the pool's current (April-September) Monthly Acreage Allocate Factor, F1, times the GPU Acreage Factor, A, or 2) an average of 2000 MCF or more per month during the months produced~~

~~within the preceding 12-month period, and the well is classified as marginal in the August Gas Proration Schedule. Gas Proration Units are to be classified as "exempt" because of their low producing ability.~~

~~— The District Supervisor of the Division's Aztec Office may classify a well or Gas Proration Unit as "exempt" at any time if the operator presents sufficient evidence to the District Supervisor indicating that the well or Gas Proration Unit is incapable of producing gas at a higher rate than that rate required for "exempt" classification for wells or Gas Proration Units in that pool.~~

~~— Once a well or Gas Proration Unit has been declared "exempt" for the following test year, it shall remain classified "exempt" for that test year.~~

~~— 3. If a test is filed on any well on a gas proration unit, the test requirement for the gas proration unit has been met. The deliverability of the unit is taken only as the resulting sum of all wells tested.~~

~~— 4. A shut-in pressure must be filed on Form C-122A even if no gas is measured during the production phase of the test. The filing of shut-in pressures for "exempt" wells is not required.~~

~~E. All Annual and Biennial Deliverability and Shut-In Pressure Tests required by these rules must be filed with the Division's Aztec office and with the appropriate gas transportation facility within 90 days following the completion of each test. Provided however, that any test completed between October 31 of the test year and January 31 of the following year are due no later than January 31. No extension of time for filing tests beyond January 31 will be granted except after notice and hearing.~~

~~— Failure to file any test within the above prescribed times will subject the well to the loss of one day's allowable for each day the test is late. A well classified as marginal shall be shut-in one day for each day the test is late.~~

### ~~SECTION 3: (3) Scheduling of Tests~~

~~A-(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]

~~By September 1 of each year, the District Supervisor of the Aztec District Office of the Division shall by memorandum notify each gas transportation facility and each operator of the pools which are to be scheduled for biennial testing during the following testing period from January 1 through the last day of December of that test year. The District Supervisor will also provide a list of "exempt" wells and a list of wells that do not have a minimum of three Annual Deliverability and Shut-In Pressure Tests on file.~~

~~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 if the seven-day shut-in period immediately follows the test flow period the four seven-day shut-in pressure would be measured in January of the test year. The earliest date that a well could be scheduled for Annual or Biennial Deliverability and Shut-In Pressure 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 the pool of the lowermost prorated completion of the well.~~

#### B. Annual and Biennial Deliverability Tests

- ~~— By November 1 of each year, each gas transportation facility shall, in cooperation with the operators involved, prepare and submit a schedule of the wells to which it is connected which are to begin testing in December and January. Said schedule shall be entitled, "Annual and Biennial Deliverability and Shut In Pressure Test Schedule", and one copy shall be submitted to the Division's Aztec office and to each operator concerned. The schedule shall indicate the date of tests, pool, operator, lease, well number, and location of each well.~~
- ~~— At least 30 days prior to the beginning of each succeeding 2-month testing interval, a similar schedule shall be prepared and filed in accordance with the above.~~
- ~~— The gas transportation facility and the Aztec District Office of the Division shall be notified immediately by any operator unable to conduct any test as scheduled.~~
- ~~— In the event a well is not tested in accordance with the existing test schedule, the well shall be rescheduled by the gas transportation facility, and the Division and the operator of the well so notified in writing. Every effort should be made to notify the Division of the new schedule prior to the conclusion of the newly assigned 14-day conditioning period.~~
- ~~— Notice to the Division of Shut In Pressure Tests which are scheduled at a time other than immediately following the flow test must be received prior to the time that the well is shut in. It shall be the responsibility of each operator to determine that all of its wells are properly scheduled for testing by the gas transportation facility to which they are connected, in order that all annual and biennial tests may be completed during the testing season. In the event a well is shut in by the State for over production, the operator may produce the well for a period of time to secure a test after notification to the Division. All gas produced during this testing period will be used in determining the over/under produced status of the well.~~

#### C. Deliverability Retests

- ~~— An operator may, in cooperation with the gas transportation facility, 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 shall be for good and substantial reason and shall be subject to the approval of the Division. Retests shall in all ways be conducted in conformance with the Annual and Biennial 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:(4) Witnessing of Tests: Any Initial Annual or Biennial Deliverability and Shut In Pressure 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]~~

## CHAPTER H606.B. PROCEDURE FOR TESTING

### SECTION 1: Initial Deliverability and Shut In Pressure Test Procedure

~~A. Within 90 days after a newly completed well is first delivered to a gas transportation facility, the operator shall complete a deliverability and shut in pressure test of the well in conformance with the "Annual and Biennial Deliverability and Shut In Pressure Test Procedures", prescribed in Section 2 of this chapter. Results of the test shall be filed as required by Section 1 of Chapter I of these rules.~~

~~B. In the event it is impractical to test a newly completed well in conformance with Paragraph A above, the operator may conduct the deliverability and shut in pressure test in the following manner (provided, however, that any test so conducted will not be accepted as the first annual deliverability and shut in pressure test as described in Paragraph A 1 of Section 2, Chapter I):~~

~~1. A seven day or eight day production chart may be used as the basis for determining the well's deliverability, providing the chart so used is preceded by at least 14 day continuous deliverability, providing the chart so used is preceded by at least 14 days continuous production. The well shall produce through either the casing or tubing, but not both, into a pipeline during these periods. The production valve and the choke settings shall not be changed during either the conditioning or flow period with the exception of the first ten (10) days of the conditioning period when maximum production would over range the meter chart or location production equipment.~~

~~2. A shut in pressure of at least seven day's duration shall be taken. This shall be the shut in test required in Paragraph A, Section 1 of Chapter I of these rules.~~

~~3. The average daily static meter pressure shall be determined in accordance with Section 2 or Chapter II of these rules. This pressure shall be used as  $P_i$  in calculating~~

~~$P_w$  for  
the Deliverability Calculation.~~

~~4. The daily average rate of flow shall be determined in accordance with Section 2 of  
Chapter II.~~

~~5. The static wellhead working pressure ( $P_w$ ) shall be determined in accordance with Section 2 of Chapter II.~~

~~6. The deliverability of the well shall be determined by using the data determined in Paragraphs 1 through 5 above in the deliverability formula in accordance with Section 2 of Chapter II.~~

~~7. The data and calculations for Paragraphs 1 through 6 above shall be reported as required in Section 1 of Chapter I of these rules, upon the blue colored Form C 122A~~

~~or on white Form C-122A and identified as "INITIAL TEST ONLY" in remarks.~~

~~SECTION 2: Annual and Biennial Deliverability and Shut-In Pressure Test Procedure~~

- (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  $P_i$  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,  $P_i$  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: [5-15-98]
- ~~1. (a)~~ A Division-designated value.
  2. (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.
  - ~~3. (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 ( $P_c$ ) 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 modification as experience may indicate desirable or necessary. [5-15-98]

- (29) ~~Initial and annual or Biennial Deliverability and Shut-In Pressure~~ 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]

~~CHAPTER III~~ 606.C. INFORMATIONAL TESTS

- (1) ~~ONE-POINT BACK PRESSURE TEST:~~ A. 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]
- 2-(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]
3. (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]
- 4-(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]
- 5- (e) he 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]
- 6- (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]
- 7- (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]

~~B. (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]~~

#### ~~CHAPTER IV TYPE OF TESTS REQUIRED FOR WELLS COMPLETED IN NON PRORATED POOLS~~

##### ~~SECTION 1: Initial Shut In Pressure Tests for Newly Completed Wells~~

~~A. (Same as Chapter I, Section 1, A)~~

##### ~~SECTION 2: Biennial Shut In Pressure Tests~~

~~A. Non prorated wells will be tested biennially as required by the District Office except as follows:~~

- ~~1. Wells which meet the "exempt" qualification as shown in Chapter I, Section 2, paragraph A 2 of these rules shall also be exempt from shut in test requirements.~~
- ~~2. Wells classified as "hardship" wells during the test year shall also be exempt from shut in test requirements.~~

~~B. All shut in tests required by these rules must be filed with the Division's Aztec office by January 31 of the following year. Failure to file the test will subject the well to being shut in one day for each day the test is late.~~

##### ~~SECTION 3: Scheduling Tests~~

~~A. By September 1 of each year, the District Supervisor of the Aztec District Office of the Division shall, by memorandum, notify each gas transportation facility and each operator of the pools which are to be scheduled for biennial shut in pressure testing during the following testing period from January 1 through the last day of December of that test year. The District Supervisor will also provide a list of "exempt" wells.~~

~~Any well scheduled for testing during its test year may have the test flow period, and some of the seven day shut in period conducted in December of the previous year. The earliest date that a well could be scheduled for a Biennial Shut In Pressure Test would be such that the Test Flow Period would end on December 25 of the previous year.~~

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

~~SECTION 4: — Test Procedure~~

~~A. 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 by deadweight gauge or other method approved by the Division on the seventh to fourteenth day of shut in of the well. The 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 reported as the shut in pressure of the well.~~

~~SECTION 5: — Filing of Shut In Pressure Data~~

~~The result of this test shall be reported in the last column of Division Form C-125 showing the pressure in psig and shall be filed in triplicate with the Aztec District Office of the Division.~~