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1.0 Purpose

This procedure provides the necessary guidance to assure that refinery equipment integrity is maintained using a combination of inspection, good engineering procedure, and appropriate pressure testing. Normal procedure is for equipment to be strength tested in the new conditions in accordance with the appropriate code. Strict adherence to this procedure is required when conducting any one of the three tests to assure personnel safety and equipment integrity during the test.

2.0 Scope

This procedure covers all Hydrostatic, Pneumatic, and Combination pressure testing of refinery equipment. The different types of tests are Strength Test, Integrity Test and Tightness Test. The procedure does not apply to pressure testing conducted at outside shops.

Section 4 defines common terms which will be used throughout this procedure.

3.0 Procedure

3.1 General Requirements for Tests

3.1.1 General - A Strength, Integrity, or Tightness Pressure Test can be a hydrostatic, pneumatic or combination test. The hydrostatic test is strongly preferred because the potential energy of a compressed gas is much greater than a non-compressible medium such as a liquid. Thus, pneumatic or combination Strength and Integrity testing should only be used when hydrostatic testing is impractical and then only under strict adherence to this procedure. When conducting any pneumatic or combination Strength or Integrity tests it is a requirement of this procedure that a pressure relief device be provided on or near the pressure source. Pneumatic and combination strength and integrity tests shall be conducted in accordance to the Pneumatic Test Procedure Form. All Pneumatic and Combination test shall have redundant calibrated test gauges placed near the test source. It is also advisable for all Pneumatic and Combination tests to review Attachment 2, Pneumatic Test Hazard, included in this procedure. Each Strength, Integrity, or Tightness test should be conducted at the specified test pressure unless the equipment is limited by metallurgical constraints (i.e. brittle fracture). Special testing criteria should be developed for this equipment if the guidelines in the When Testing Is Required section are deemed to be inadequate.

3.1.2 Strength Pressure Test is any test which exceeds the maximum allowable working pressure (MAWP) of the equipment, or the lowest MAWP of any item in the test system. Strength pressure tests are required to verify repairs or alterations that affect the minimum required thickness boundary of pressure vessels and piping systems. When strength pressure testing is not practical (i.e. foundation constraints, metallurgical constraints, process reasons) the chart in the section When Testing Is Required shall be followed. For pneumatic or combination strength tests a pressure relief device shall be provided on or near the pressure source. All strength pressure tests for pressure vessels, and pneumatic or combination strength pressure tests for piping systems, are required to have the forms outlined in the section Integrity/Strength Testing Authorization filled out. For hydrostatic strength pressure test of piping systems the forms are optional; however, records of such test should be made (i.e. job notes, work orders).

3.1.3 Integrity Pressure Test is any test at the maximum allowable working pressure of the equipment or the lowest maximum allowable working pressure of the test system. Integrity pressure test should be used for heat exchanger, or special equipment (i.e. boilers, filter housings, coalescers), to locate, and verify repair of, tube leaks and gasket sealing soundness. The forms outlined in the section Integrity/Strength Testing Authorization are only required for pneumatic or combination integrity pressure test.

3.1.4 Tightness Pressure Test is any test that is below the lowest relief valve setting of the equipment or test system.

3.1.4.1 Principles associated with tightness testing are:

3.1.4.1.1 Tightness pressure tests can be used to hydrocarbon or O2 free a system, or to ensure that equipment or systems are serviceable and leak-free prior to startup.

3.1.4.1.2 This test is used after equipment has been opened with no structural repairs being made to pressure parts. Tightness testing should be conducted in accordance with standard operating procedures and safety requirements. For tightness pressure tests, the forms outlined in the section Integrity/Strength Testing Authorization are not required to be filled out.

3.1.4.1.3 Controls must be in place to avoid venting oxygen to a flare system, and to prevent over-pressure of equipment.

3.1.4.1.4 For most equipment, the maximum tightness test pressure is 85% of the lowest system or relief valve setting, or 85% of MAWP, whichever is lower.

3.1.4.1.5 For some equipment in service at hydrocracking and hydrotreating units (RHU, ULC, UU3, UU4, and DDU's), the maximum pressure allowable when conducting a tightness test may be lowered to avoid brittle fracture. Consult unit NOP's or a metallurgist to determine the maximum allowable tightness test pressure.

3.1.4.1.6 For rotating equipment, consult unit NOP's or the Rotating Equipment Group for maximum tightness test pressure.

3.1.4.1.7 Exceptions to the provisions in this procedure regarding tightness testing must be approved by the Operations Leader.

3.1.4.2 Controls required during tightness testing for air, nitrogen, or other compressible gas:

3.1.4.2.1 Pressure relief devices on the vessel in place and in operating condition, **not** lined up to a flare:

3.1.4.2.1.1 If the source pressure is incapable of exceeding 85% of the lowest system or vessel relief valve setting or the maximum tightness test pressure if it is lower, no additional controls are needed.

3.1.4.2.1.2 If the source pressure is capable of exceeding 85% of the lowest system or relief valve setting or the maximum tightness test pressure if it is lower, an operator must continuously stand by and control the pressure to ensure the system pressure does not exceed the maximum tightness test pressure (no more than 85% of the relief valve set pressure).

3.1.4.2.2 Pressure relief devices on the vessel in place and in operating condition, lined up to the flare:

3.1.4.2.2.1 If the source pressure is incapable of exceeding 85% of the lowest system or vessel relief valve

setting or the maximum tightness pressure if it is lower, no additional controls are needed

3.1.4.2.2.2 If the source pressure can exceed the maximum tightness test pressure, an operator must continuously stand by and control the pressure to ensure the system pressure does not exceed the maximum tightness test pressure (no more than 85% of the relief valve set pressure).

3.1.4.2.2.3 If the pressure source can exceed 85% of the lowest system or vessel relief valve setting,

- A level 2 risk assessment reviewed by the Process Engineering Technical Authority
- An operator must continuously stand by and control the pressure to ensure the system pressure does not exceed the maximum tightness test pressure (no more than 85% of the relief valve set pressure.
- A risk assessed startup procedure with signoff steps. The requirement to stand by and control system pressure shall be in the Operating or LOTO procedure as part of the de-commissioning or re-commissioning steps.

3.1.4.2.3 Pressure relief devices on the vessel or system NOT in place or not in operating condition:

3.1.4.2.3.1 If the source pressure is incapable of exceeding 85% of MAWP or the maximum tightness pressure if it is lower, no additional controls are needed.

3.1.4.2.3.2 If the source pressure is capable of exceeding 85% of MAWP or the maximum tightness pressure if it is lower:

- A regulator set at 150 psig shall be installed.
- An operator must continuously stand by and control the pressure to ensure the system pressure does not exceed the maximum tightness test pressure (no more than 85% of MAWP).
- The requirement to stand by and control system pressure shall be in the Operating or LOTO procedure as part of the de-commissioning or re-commissioning steps.

3.1.4.3 When using steam for tightness testing, the following controls shall be in place:

3.1.4.3.1 Steps in the LOTO or startup procedure to insure adequate vents remain open to prevent over-pressure of equipment, and to insure steam reaches all parts of the system.

3.1.4.3.2 Steps in the LOTO or startup procedure to "break the vacuum" when the steam is turned off and the steam in the system starts to condense.

3.1.4.3.3 Steps in the LOTO or startup procedure to insure all water is drained prior to introduction of hydrocarbons.

3.1.4.4 Reinforcing pad or saddle tests are classified as tightness test. The pneumatic test for these fittings shall not exceed 25 psi.

3.2 Integrity/Strength Testing Authorization

3.2.1 Integrity/Strength Testing Authorization is intended to insure that each test procedure is developed with the participation of personnel from operations, maintenance, engineering, and inspection. The authorization form shall be filled out for pneumatic or combination integrity test or for hydrostatic, pneumatic, or combination strength tests. This authorization is not required for hydrostatic integrity test. When testing piping, this form is optional for hydrostatic strength testing; however, records of such tests should be made (i.e. job notes, work orders). Prior to the test, the Integrity/Strength Testing Authorization form should be completed by the unit maintenance engineer or project engineer. Assistance should be sought from engineering, inspection, operations, or maintenance where appropriate. Review and approval of integrity or strength tests are required from the MPC Mechanical Discipline Engineer, Inspection Supervisor and Operations Superintendent. When pneumatic or combination integrity or strength testing is involved, the additional approvals from Inspection Authority and the Operations Leader shall be obtained. Pneumatic and combination strength and integrity test shall be conducted in accordance to the Pneumatic Test Procedure Form. This form is to be filled out just before the test, and be present during the test. The form Report of Pneumatic Testing shall be completed after the test. This form documents that the pneumatic or combination test was completed as specified. The authorization form and Report of Pneumatic Testing form should be filed at the unit for thirty (30) days.

3.3 When Testing is Required

The table below lists various pressure vessel and piping systems maintenance activities and guidelines for testing:

Class of Work	**Maintenance Strength Test Requirement**	**Can Strength Test be Waived?**	**Documentation Required**
Equipment Not Opened	N/A	N/A	Per unit std operating procedures
Disassembly/ Reassembly of Components with No Repairs	N/A; tightness test; integrity test (6)	N/A	Per unit std operating procedures (7)
Repairs	Normally required (8)	Under special conditions (1, 5)	Integrity/Strength Testing Authorization
Rerates	Normally required only if MAWP is increased	(2)	Integrity/Strength Testing Authorization
Alterations	Normally required (8)	Under special conditions (1,3)	Integrity/Strength Testing Authorization

NOTES:

1. Use of superior quality materials, design details, fabrication procedures, or Non-Destructive

Examination may be considered as an alternative in conjunction with a review by a MPC Mechanical Discipline Engineer and a MPC certified Inspector, (see Section 3.4, Conditions for Waiver of Strength Testing).

2. If the rerate involves an increase of the MAWP, the system must be strength tested unless the original test covers the new service conditions.
3. Substituting special procedures for a pressure test after an alteration may be done only after consultation with a MPC Mechanical Discipline Engineer, and only when testing is impractical.
4. For piping systems see Section 3.4, Condition for Waiver of Strength Testing.
5. Integrity test should only be used to locate, and verify repair of, tube leaks and gasket sealing soundness on heat exchangers and special equipment.
6. If a pneumatic or combination integrity test is performed the documentation in the Integrity/Strength Testing Authorization section is required.
7. For boilers, the refinery boiler inspectors should be contacted before making boiler repairs, whether routine or major, so that the required approval from the State Authorized Inspector can be obtained. The required pressure test for routine repairs (weld repairs to tubes and replacement of tubes) should be done at the set pressure of the lowest relief valve setting. A strength pressure test should only be done for major repairs, rerates or alterations. If possible, the strength pressure test should be limited to the new parts only.

3.4 Conditions for Waiver of Strength Testing

The following conditions must be satisfied before a strength pressure test can be waived:

3.4.1 Pressure Vessels:

3.4.1.1 The scope of work must be reviewed and approved by an MPCMechanical Discipline Engineer experienced in pressure vessel design, and the Inspection Supervisor and Operations Superintendent.

3.4.1.2 Materials used for the work must be compatible with the existing material, and must be to the current ASME code or the ASME Code Edition to which the original vessel was built.

3.4.1.3 The new shell welds shall have complete penetration and fusion. The root pass and final pass(es) shall be examined by magnetic particle or liquid penetrant methods for their complete length. In addition, the finished weld shall be fully examined using acceptable non-destructive examination methods (radiograph, UT shearwave, etc.). Examination and acceptance criteria shall be per the applicable section of the ASME Code.

3.4.1.4 The new nozzle welds and other new shell penetrations shall have complete penetration and fusion. The root pass of the nozzle attachment weld shall be back-gouged and examined by magnetic particle or liquid penetrant methods. The completed weld shall be examined by the ultrasonic method. Examination and acceptance criteria shall be per the applicable section of the ASME Code.

3.4.2 Piping Systems:

3.4.2.1 All circumferential, longitudinal, and spiral groove welds that have not been subjected to a hydrostatic or pneumatic pressure test in accordance with ASME/ANSI B 31.3 shall be 100% radiographed.

3.4.2.2 All welds, including structural attachment welds, that can not be 100% radiographed in (1) above, shall be examined by the liquid penetrant or magnetic particle method.

3.4.2.3 A flexibility analysis of the piping system shall be performed.

3.4.2.4 A bubble test or helium leak test shall be performed in accordance with ASME Section V, Article 10.

3.4.2.5 For closure welds (i.e., NDE in lieu of hydro welds), sensitive leak testing can be waived. See Quality Manual QAC-M-01.

3.4.3 Boilers and Boiler Piping:

3.4.3.1 Repairs to boiler drums, tubes from the drums, and superheat tubes to the first block valve should be hydrostatically pressure tested per Note 8 in the When Testing Required section.

3.4.3.2 All piping after the first block valve; if a hydrostatic, pneumatic or helium test is not practical an initial service test (tightness test) can be performed.

3.5 Applicable Codes & Standards

Whenever pressure testing is performed, it must be done per the applicable codes and specifications. The list below defines some of the major codes and specifications by equipment type.

3.5.1 Pressure Vessels:

3.5.1.1 New – ASME Boiler & Pressure Vessel Code, Section VIII, Division 1 (or Division 2, as applicable).

3.5.1.2 In service – ANSI/NB 23 National Board Inspection Code, API 510 Pressure Vessel Inspection Code,

3.5.2 Boilers:

3.5.2.1 New – ASME Boiler & Pressure Vessel Code, Section I

3.5.2.2 In service – National Board Inspection Code Texas Boiler Inspection Law

3.5.3 Piping:

3.5.3.1 ASME/ANSI B31.1, Power Piping

3.5.3.2 ASME/ANSI B31.3, Chemical Plant & Petroleum Refinery Piping

3.5.3.3 API 570, Piping Inspection Code.

3.5.4 General:

3.5.4.1 TCR-QAC-M 01 - Quality Assurance Quality Control for Piping Systems

3.5.4.2 TCR-SIP-M 02 - Quality Assurance and Quality Control Procedure for the Fabrication, Inspection, and Erection of Pressure Vessels

3.5.4.3 TCR-ENG P-11 Pressure Testing

4.0 Definitions

4.1 ***Alteration*** – A physical change in any existing pressure vessel component having design implications which affect the pressure containing capability beyond the scope of the items described in the existing Manufacturer's Data Reports (Form U-1).

4.2 ***MPC Mechanical Discipline Engineer*** – An authorized engineer for the mechanical discipline designated by the Engineering Authority who is knowledgeable in pressure vessel design, fabrication, inspection, and testing.

4.3 ***Combination Test*** – Any pressure test which utilizes both a compressible and noncompressible

fluid. This test is treated as a pneumatic test.

4.4 ***Hydrostatic Test*** – Any pressure test which utilizes a noncompressible fluid (usually water), to build pressure in the system.

4.5 ***Authorized Inspector*** – Individual ASNT-TC-1A Level I certified and designated by the Inspection Authority.

4.6 ***Integrity Test*** – Any hydrostatic, pneumatic, or combination pressure test at the MAWP.

4.7 ***Maximum Allowable Working Pressure (MAWP)*** – The maximum gauge pressure which can be safely applied to a test system. This pressure is established by calculations which exclude material thickness intended as corrosion allowance, while allowing for static head.

4.8 ***Pneumatic Test*** – Any pressure test which utilizes a compressible gas (usually air, steam, or nitrogen) to build pressure in the system.

4.9 ***Repair*** – Any work necessary to restore an existing pressure vessel to a condition suitable for safe operation at the design condition that affects the pressure containment.

4.10 ***Rerate*** – A change in the temperature and/or the MAWP rating of an existing pressure vessel.

4.11 ***Strength Test*** – Any hydrostatic, pneumatic, or combination pressure test which exceeds the lowest MAWP of any item in the test system.

4.12 ***Test System*** – Any vessel, exchanger, furnace, piping system, or combination thereof which will be tested as an isolated system.

4.13 ***Tightness Test*** – Hydraulic Tightness Pressure Test is any test that is below the lowest relief valve setting of the equipment or test system. Pneumatic or combination tightness pressure test is any test that is at or below 35 % MAWP of the equipment or test system.

5.0 References

5.1 See Section 3.5 for applicable codes and standards

6.0 Attachments

6.1 Attachment 1: Pneumatic Test Hazard

6.2 Attachment 2: Integrity/Strength Testing Authorization Form

6.3 Attachment 3: Report of Pneumatic Testing

6.4 Attachment 4: Pneumatic Test Procedure Form

7.0 Revision History

Revision Number	Description of Change	Written by	Approved by	Revision Date	Effective Date
0	Initial Version	M. T. Garvin	G. R. Carter	27-Aug-01	27-Aug-01
1	Revised to align with Control of Work Policy	M. K. Alberts	K. M. Casey	01-Apr-08	01-Apr-08
3	Revised to address requirements when tightness testing to hydrocarbon or O2 free equipment.	M. K. Alberts	K. M. Casey	16-Nov-09	16-Nov-09
4	Reformatted as MPC GBR procedure. Reviewed by Engineering Team and technical references updated. Alignment with MPC standards subject to future revision.	M. K. Alberts	L. D. Mazur	30-Sep-14	30-Sep-14

Attachment 1

Pneumatic Test Hazard

1. A pneumatic test may be used when it is impractical to hydrostatically test due to temperature, foundation, or process reasons.
2. If process incompatibility precludes the use of water as a pressure testing medium, every effort should be made to find a substitute compatible non-compressible pressure testing liquid before resorting to a pneumatic test.
3. The potential energy generated by a pneumatic test is an important determining factor to assess the relative risk of the test. The larger the volume of the system and the higher the test pressure, the higher the potential energy.
4. When conducting pneumatic strength tests, all personnel not conducting the test should remain away from the area until the test has been completed and the pressure has been reduced. Only the personnel directly involved with the test should be permitted within a twenty-five (25) yard radius of the system being tested. Those personnel should consider the consequences of their positioning during the test.
5. The metal temperature during the pneumatic test shall be maintained at least 30 F above the minimum design metal temperature to minimize the risk of brittle fracture.
6. The gas used as the test fluid shall be nonflammable and non-toxic. For combination tests a combustible liquid may be used only at temperatures below their flash point and by following any special precautions and procedures.
7. All items not subjected to the test pressure shall be disconnected or isolated by blocks or blinded.
8. A preliminary pneumatic test not to exceed 25 psig may be applied as a means of locating major leaks.
9. ANSI/ASME B31-3, Para. 345.3.3 states "Expansion joints shall be provided without temporary restraint. Expansion joints which depend on external main anchors to restrain pressure end loads shall be tested in place.
10. Pneumatic strength test are not allowed on steam generating equipment by ASME Section I.
11. Special strength test procedures apply to all cryogenic or low temperature vessels and systems.

In venting a system where nitrogen or other inert gases are present, caution is necessary to prevent formation of oxygen-deficient breathing areas. Venting should be done to open areas to avoid accumulation of the inert gases being vented.

Attachment 2

Integrity/Strength Testing Authorization

Unit _____ Job Note or Work Order No.

Equipment/System Being Tested: Vessel[1] _____ Exchanger _____ Piping[2] _____

Furnace _____ Other _____

Equipment/System Description & Service

Reason for Test

Test Method: Hydrostatic _____ Pneumatic[3] _____ Combination[3]

Initial Pressure[4] _____ x Test Factor[5] _____ x Temp Factor[6] _____ = Test Pressure [7] _____PSI

Test Medium: Air _____ N2 _____ Water _____ (< 30 ppm Cl ___) Other

Temperatures[8]: Ambient _____F Test Medium _____F Metal _____F

Material(s) in Test System

Minimum Test Temperature[9] _____F (+ 30 F)[10] = _____F Metal Test Temperature,

or Special Test Requirements

Are Foundation/Supports Adequate to Support Additional Test Weight?	☐ NA	☐ Yes	☐ No
Will Relief Valves be Blinded or Clamped?	☐ NA	☐ Yes	☐ No
Can Equipment/System be Properly High Point Vented?		☐ Yes	☐ No
Will Equipment/System be Visually Inspected for Defects and Tightness?		☐ Yes	☐ No
Will Instrumentation on Equipment be Blinded or Removed?	☐ NA	☐ Yes	☐ No
Are Expansion Joints in the System to be Tested?		☐ Yes	☐ No
For Pneumatic Strength Test Only:			
A Pressure Relief Device will be placed near the test source not exceeding the test pressure plus the lesser of 50 PSI or 10% of the Test Pressure?	☐ NA	☐ Yes	☐ No
Has Pneumatic Test Procedure Form been Prepared?	☐ NA	☐ Yes	☐ No

_____

Prepared By Date

_____

Procedures approved by MPC Mechanical Discipline Engineer Date

_____

Procedures approved by Inspection Supervisor Date

_____

Procedures approved by Operations Superintendent Date

Additional approvals for pneumatic strength testing:

_____

MPC Inspection Authority Date

_____

Operations Leader Date

NOTES: See Back of Form

NOTES:

1. For new vessel construction within MPC shops, formal documentation (such as this form or equivalent and Report of Pneumatic Testing form) is required for all pneumatic strength testing. It is optional for hydrostatic strength testing; however, records of such test should be made (i.e. job notes, work orders).
2. For piping, formal documentation (such as this form and Report of Pneumatic Testing form) is required for all pneumatic strength testing. It is optional for hydrostatic strength testing for piping; however, records of such test should be made (i.e. job notes, work orders).
3. The Report of Pneumatic Testing shall be completed after test.
4. For heat exchanger/special equipment Integrity tests, the initial pressure will be the MAWP.
   For piping and furnace Strength tests the initial pressure will be the design pressure.
   For boiler routine repairs the initial pressure will be the set pressure of the lowest relief valve setting.
   For boiler major repairs, rerates or alterations the initial pressure will be the MAWP.
   For pressure vessel rerates the initial pressure will be the new calculated MAWP for the vessel.
   For pressure vessel Strength tests the initial pressure will be MAWP.
   (For hydrostatic testing of vertical vessels consult with an MPC Mechanical Discipline Engineer about foundation and static head concerns.)

5. For Integrity Tests (hydrostatic, pneumatic, or combination) the test factor is 1.0. For strength tests, refer to the table below for the appropriate test factor.

	Hydrostatic Test Factor	Pneumatic or Combined Test Factor	Notes - based on the rating code
ASME VIII-1	1.5*	1.25	Pre '99 addendum CAUTION: Use of 1.5 multiplier on equipment built after 1998, could cause damage.
	1.3	1.1	Rated to '99 addendum and later (higher design allowables)
ASME VIII - 2	1.25	1.15	
ASME Sect I	1.0	Not allowed	Routine repairs
	1.5	Not allowed	Major repairs and alterations
B31.3 Piping	1.5*	1.1	* Ratio in part 6 shall not exceed 6.5 (temperature multiplier).
B31.1 Piping	1.5	1.2-1.5	
Furnace tubes and headers	1.5*	See MPC Mechanical Discipline Engineer	* Per API 560, the maximum test pressure shall be limited to the extent that the weakest component shall not be stressed beyond 90% of the material's yield strength at ambient temperature. Also hydrostatic test pressures shall be maintained for a minimum period of 1 h to test for leaks.

6. Factor for temperature adjustment for Strength pressure tests only: (This is not used for pneumatic testing of piping) Note - stress values are from the year of the rating of the code.
   $$\frac{\text{Allowable Stress at Test Temperature per ASME Sec. VIII}}{\text{Allowable Stress at Design Temperature per ASME Sec. VIII}}$$
7. For hydrostatic testing of piping systems, if the test pressure will produce a stress above the yield strength at the test temperature, the test pressure should be reduced to the maximum pressure that will not exceed the yield strength at the test temperature.
8. Estimated temperatures at time of test.
9. Transition temperature of the materials in the test system for pneumatic and combination tests should be considered and discussed with a metallurgist. For hydrostatic tests of carbon and low alloy steel, consult ASME Section VIII UCS 66 for Division 1 vessels (impact exemption curves). For materials not listed consult with a metallurgist.
10. For all tests 30 F shall be added to the test temperature. Lower temperatures may be used after consultation with metallurgist and mechanical discipline engineer.

Attachment 3
Report of Pneumatic Testing

Note: This portion of the form should be completed for pneumatic or combination testing only.

Facility _____ Equipment or System _____

Date of Test _____ Length of Test _____

Final Test Pressure _____

Test Results: Passed _____ Failed

Comments: _____

_____

_____

_____

_____

_____

_____

Test Witnessed By:

_____
Maintenance Supervisor

_____
Operations Supervisor

_____
MPC Inspector

Attachment 4

Pneumatic Test Procedure Form

Unit _____ Equipment or System _____

1. Test pressure = _____ PSIG. (From Integrity/Strength Test Authorization)
2. Are relief valves blinded or clamped? ☐ NA ☐ Yes ☐ No
3. Has equipment/system been visually inspected for defects and tightness? ☐ Yes ☐ No
4. Are all repairs, PWHT, specified inspection, etc., complete? ☐ Yes ☐ No
5. Are redundant calibrated test gauges installed near the test source? ☐ Yes ☐ No
6. Has instrumentation on equipment been blinded or removed? ☐ Yes ☐ No

Questions 2 thru 6 must be answered Y or NA before the test can be conducted.

7. Verify pressure relief device is on or near the test apparatus with a setting of _____psig. (Test pressure plus the lesser of 50 PSI or 10% of the test pressure)
8. Rope off a twenty-five (25) yard radius of the system being tested.
9. Clear all personnel not directly involved with the test while the pressure is being increased.
10. Gradually increase the pressure until a gauge pressure which is the lesser of one-half the test pressure or 25 PSI has been attained. This pressure should be maintained for at least ten (10) minutes, while making a check for leaks.
11. After completing a preliminary check for leaks, increase the pressure in steps of approximately one tenth of the test pressure and maintain for ten (10) minutes at each step until the required test pressure has been reached. Pressure Increase Increments = _____ PSIG.
12. Hold the test pressure for a minimum of fifteen (15) minutes.
13. Reduce the pressure to a value equal to the MAWP pressure and hold for a sufficient time to permit final inspection. *MAWP pressure - _____PSIG.
    * Does not apply for Integrity Tests.
14. After final inspection, depressure system and verify system is depressured.
15. Remove all barricades.

Reviewed by: _____
Maintenance Supervisor *Date*

_____
Operations Supervisor *Date*

_____
MPC Inspector *Date*