



**TESORO LOGISTICS OPERATIONS, LLC.  
HIGH PLAINS PIPELINE SYSTEM – ND**

**BEULAH BASIN  
RAIL LOADING 10" PIPELINE  
PROJECT**

**PIPELINE HYDROSTATIC TEST  
SPECIFICATIONS  
&  
FIELD TEST FORMS**

**PIPELINE HYDROSTATIC TEST SPECIFICATIONS  
&  
FIELD TEST FORMS**

**GENERAL**

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## **SECTION 1 A**

### **PURPOSE**

This Standard establishes uniform practices for the design and planning, execution, review, and documentation for hydrostatic tests of piping associated with new construction, existing pipelines, station piping, and emergency stock pipe in accordance with:

- Department of Transportation (DOT) 49 CFR 195.300, Subpart-E — Pressure Testing
- Department of Transportation (DOT) 49 CFR 192.500, Subpart-J — Testing Requirements
- ANSI B31.4, "Liquid Petroleum Transportation Piping",
- ANSI B31.8, "Gas Transmission and Distribution Piping Systems,"
- API 1110, "Pressure Testing of Liquid Petroleum Pipelines", Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP) Pipeline Integrity Management
- API 1160, "Managing System Integrity for Hazardous Liquid Pipelines"
- Tesoro Logistics LP "Integrity Management Program"

This Standard is intended to be consistent with all Tesoro Logistics LP Standards.

## **SECTION 1 B**

### **GENERAL SCOPE**

This Standard covers piping associated with new construction, existing lines, station piping, and emergency stock pipe in both Department of Transportation (DOT) and "non-DOT" regulated service pipelines in accordance with the latest edition of the applicable codes and standards and as set forth herein.

SECTION 1 C

DEFINITIONS

"**Accepted Test Pressure**" shall mean the minimum pressure observed during the continuous period of time equal to the minimum specified test duration.

"**Central File**" shall mean the storage facility for all completed Hydrostatic Test Books.

"**Central Files-Ref-No**" shall mean Central Files Reference Number assigned to an original Hydrostatic Test Book.

"**Central Files Administrator**" shall mean the individual tasked with maintaining Tesoro Logistics LP pipeline documentation.

"**TESORO Representative**" shall mean the person assigned by the "TESORO" as its representative.

"**Component**" shall mean any part of a pipeline, which may be subjected to pump pressure including, but not limited to pipe, valves, appurtenances, fitting, flanges, and closures.

"**Contractor's Manager**" shall mean the person assigned by the "Contractor" as the Manager / Superintendent or his designated representative.

"**Project Engineer**" shall mean the individual tasked with providing engineering oversight for Tesoro Logistics LP district pipeline facilities.

"**Operations Manager**" shall mean the individual tasked with providing oversight for Tesoro Logistics LP's district pipeline operations.

"**Drafting Coordinator**" shall mean the individual tasked with maintaining Tesoro Logistics LP pipeline drawings.

"**Extra Work**" shall mean that work not included in the "Scope of Work," but is work requested of the "Contractor" by the "TESORO Representative."

"**Health, Environment and Safety Department Representative**" shall mean the individual tasked with ensuring Tesoro Logistics LP Health, Environment and Safety Standards and practices are followed.

"**IDP**" shall mean the "**Internal Design Pressure**" allowed based on the material characteristics (grade, wall thickness, type). The IDP is normally defined as the pressure that will result in a stress equal to the Specified Minimum Yield Strength ("SMYS") of the material multiplied by an applicable design factor.

"**Engineering Administrative Assistant**" shall mean the individual tasked with maintaining Tesoro Logistics LP pipeline engineering files — Hydrostatic Test Data Base.

"**Engineering Manager**" shall mean the individual tasked with providing oversight for Tesoro Logistics LP pipeline engineering functions.

"**Hydrostatic Test Log**" normally means a recording of data during a hydrostatic test at equally spaced time intervals. For tests performed prior to 1/8/71, the Office of Pipeline Safety has indicated that any record (documentation or data) may be used to show that

an acceptable test was conducted, as long as such records were made at the time of the test and result directly from that testing

**“Hydrostatic Test Book”** is Tesoro Logistics LP. (TLLP) record of the hydrostatic test and ensures that the record created by Tesoro Logistics LP complies with current Department of Transportation (DOT) 49 CFR 195.300, Subpart-E — Pressure Testing and the Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP) governing the content of such records.

**“Hydrostatic Test Database”** shall mean the sum of Tesoro Logistics LP entire hydrostatic test records required by Department of Transportation (DOT) 49 CFR 195.300 Subpart-E — Pressure Testing and the Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP) governing the content of such records — including supporting drawing, files, etc.

**“Mainline”** shall mean all parts of a pipeline facility through which a hazardous liquid moves in transportation, including, but not limited to, line pipe, valves, fittings, and other appurtenances connected to the line pipe.

**“MAOP”** means the “maximum operating pressure allowed” based on the material characteristics (Grade, Wall Thickness, and Type). The MAOP is normally defined as the pressure that will result in a stress equal to the Specified Minimum Yield Strength (“SMYS”) of the material multiplied by an applicable design factor. ”

**“Mechanical Contractor”** shall mean the firm or organization, including Mechanical Contractor’s employees, agents, and other representatives, and the employees, agents, and other representatives of its’ “Subcontractors” which have agreed / contracted to provide labor, material, and equipment necessary to hydrostatically test newly constructed pipeline or station as described by this Standard and Attachments.

**“Operations Superintendent / Foreman”** shall mean the individual tasked with providing operations oversight for Tesoro Logistics LP Jurisdictional and non-DOT Jurisdictional pipeline facilities.

**“On-Site Piping”** shall mean piping that is fabricated in the field and is hydrostatically tested separately before being tied into a larger system (mainline or station piping).

**“TESORO”** shall mean Tesoro Logistics LP. (TLLP), and its’ operated systems. In the event that the TESORO is performing the Scope of this Standard, the terms “Mechanical Contractor” and “Testing Contractor” shall also apply to the “TESORO.”

**“Pipeline”** shall mean all parts of a pipeline facility through which a hazardous liquid moves in transportation, including, but not limited to, line pipe, valves, fittings, and other appurtenances connected to the line pipe.

**“Pre-Fabricated Assembly”** means any part of a pipeline consisting of more than one piping component that is fabricated prior to installation in a pipeline and for which a post installation hydrostatic test is normally impractical.

**“Pressure Test Record Review”** shall mean the process used for assessing a hydrostatic test record for completeness. The “Pressure Test Record Review” documents this process.

**“Project Engineer”** means the primary person assigned to manage the physical completion and the engineering / operational records associated with a project. This

individual may be a Tesoro Logistics LP. Employee or a contracted individual who will be overseeing the proper documentation of the hydrostatic testing activities.

**"Scope of Work"** as used herein refers to any job specific requirement set forth by "TESORO" in addition to the general requirements set forth in this Standard.

"SMYS" means the "specified minimum yield strength of the material."

**"Specification"** as used herein refers to the minimum requirements of the TESORO in the performance of the "Scope of Work."

**"Specified Minimum Hydrostatic Test Pressure"** means the designated minimum pressure to which a pipeline section is to be tested. The minimum test pressure will usually be specified by the person responsible for the hydrostatic test and will be based on the pipe's physical characteristics and operating requirements. It is normally the minimum test pressure that should be applied to the most elevated point in the test segment.

**"Standard"** as used herein refers to the Codes, Regulations, Specifications, and Standards described in this Standard, and all other forms or documents comprising the contract between "TESORO" and the "Contractor" for the work described herein.

**"Station"** shall mean all parts of a pipeline facility through which a hazardous liquid moves in transportation, including, but not limited to, piping between station isolation valves, pumping units, fabricated assemblies therein, and lines to breakout tanks.

**"Stock Pipe"** shall mean pipe specifically hydrostatically tested by itself and is not associated with any piping system (station or mainline) and will be stored as inventory, including piping that was hydrostatically tested as part of a project, but is left over for inventory.

**"Subcontractor"** shall mean the firm or organization that has agreed to perform a portion of the work contracted to the "Contractor".

**"Tesoro"** or **"TESORO"** means Tesoro Logistics LP. (TLLP)

**"Testing Contractor"** shall mean the firm or organization including Testing Contractor's employees, agents and other representatives which has agreed / contracted with "TESORO" to provide labor, material and equipment necessary to provide hydrostatic testing services on existing pipelines and stations. In addition, on newly constructed pipelines or stations, "Mechanical Contractor" as a "Subcontractor" to provide testing services may utilize "Testing Contractor". In some instances, the "Mechanical Contractor" may provide "Testing Contractor" services.

## SECTION 1 D

### INTRODUCTION

This Standard establishes uniform practices that shall be followed for the design and planning, execution, review, and documentation for hydrostatic testing of piping associated with new construction, existing pipelines, station piping, and emergency stock pipe for all Tesoro Logistics LP. (TLLP) operated pipeline systems or parts of a system. The practice has been designed in accordance with the following regulations, standards, codes, and practices:

Part 192, Title 49 CFR – “Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards,”.

Part 195, Title 49 CFR - “Transportation of Hazardous Liquids by Pipeline: Minimum Federal Safety Standards,”.

ANSI B31.4, “Liquid Petroleum Transportation Piping,”.

ANSI B31.8, “Gas Transmission and Distribution Piping Systems,”.

API 1110, “Pressure Testing of Liquid Petroleum Pipelines,”.

API 1160, “Managing System Integrity for Hazardous Liquid Pipelines,”

Any conflict in this Standard shall be reported immediately to the Engineering Manager. In the case of conflict between this Standard, referenced publications, or other associated documents, the following order of precedence shall be applicable:

***Applicable law***

**Codes or standards having the force of law**

**This Standard**

All newly constructed pipelines and modification to existing pipelines shall be properly pressure tested before being placed in or returned to service.

This Standard applies to pressure testing of both Liquid Petroleum Transportation Piping and Gas Transmission and Distribution Piping Systems.

**ROLES AND RESPONSIBILITY**

It is the responsibility of the Engineering Manager to ensure that all Tesoro Logistics LP. (TLLP) operated pipeline systems, or parts thereof, are properly pressure tested following this Standard. The responsibility for the actual performance of the design and planning, execution, and documentation of the pressure test may be done by Contract Engineer or Contract Engineer, Central Files Administrator, Engineering Administrative Assistant, and Drafting Coordinator.

Engineering Department shall be responsible for:

Approving the number and limits of proposed test segments for the pipeline or station piping that is to be isolated for purposes of pressure testing.

Approving the test pressure range required for each test, including the minimum pressure at the primary pressure reading location (deadweight tester), highest elevation in the test section, the maximum pressure allowed at the lowest elevation in the test section, and the maximum pressurization allowed above the minimum for variations due to stabilization.

Ensuring that all hydrostatic tests are designed, executed and documented following this Standard.

Reviewing and approving the hydrostatic test documentation (Hydrostatic Test Book) for completeness and accuracy.

Reviewing and approving the Hydrostatic Test Review forms (See Appendices) that summarizes the supporting documentation in the underlying Hydrostatic Test Book.

Reviewing and approving the hydrostatic test updates to Hydrostatic Test Record Database and the Hydrostatic Test Drawing Files.

Project Engineer shall be responsible for hydrostatic testing of DOT Jurisdictional pipeline facilities and other associated non-DOT Jurisdictional piping.

Contract Engineer shall be responsible for hydrostatic testing of non-DOT Jurisdictional pipeline facilities — gathering systems.

It is the responsibility of the Project Engineer or Contract Engineer to determine the hydrostatic test segment limits and test pressures.

**The Pipeline Pressure Test Record** shall be utilized by the Project Engineer or Contract Engineer to communicate the proposed test parameters.

It is the responsibility of the Project Engineer or Contract Engineer to create and complete the Hydrostatic Test Book, and to ensure that all necessary hydrostatic test records created are complete and accurate following this Standard.

For existing pipelines / stations — the Project Engineer or Contract Engineer shall be responsible for preparing the Hydrostatic Test Plan and writing the Hydrostatic Test Plan's Critical Task Analysis for performing the hydrostatic test. For existing pipelines / stations, the Critical Task Analysis shall be reviewed and approved by the Engineering Department and Operations Manager.

The Engineering Department shall be responsible for writing the Commissioning, Decommissioning and Re-Commissioning Plan section of the Hydrostatic Test Plan.

On new pipeline / station construction, the Mechanical Contractor is responsible for hydrostatic testing services. However, Mechanical Contractor may utilize a Testing Contractor to perform such work. The testing requirements listed in this Standard shall be adhered to by Mechanical Contractor / Testing Contractor. The Mechanical Contractor is responsible for preparing the Hydrostatic Test Plan following form and content of the "Hydrostatic Test Plan Outline / Format for Testing Pipelines" .

For existing pipelines / stations, the Mechanical Contractor, TESORO, or TESORO's Testing Contractor may be responsible for the hydrostatic testing services. The testing requirements listed in this Standard shall be adhered to by Mechanical Contractor, TESORO, or TESORO's Testing Contractor.

All hydrostatic tests shall be conducted under the supervision of a qualified Inspector following Tesoro Logistics LP. (TLLP) Operator Qualification Plan.

The Inspector shall ensure that the specifications and procedures contained in this Standard are adhered to during the performance of all hydrostatic tests.

It is the responsibility of the Project Engineer or Contract Engineer to complete the “Hydrostatic Test Qualification Calculation” and the “Constrained Pipe Qualification Calculation” for ‘buried-pipe’ hydrostatic tests, and to approve the hydrostatic tests prior to rigging-down. When the Testing Contractor performs the Hydrostatic Test Qualification and Constrained Pipe Qualification Calculations, the Project Engineer or Contract Engineer shall verify the qualification calculations, and approve the hydrostatic test.

It is the responsibility of the Project Engineer or Contract Engineer to complete the Hydrostatic Test Review upon finalizing the Hydrostatic Test Book. The completed Hydrostatic Test Book (original and copy) shall be forwarded to the Central Files Administrator for inclusion into the Central Files, database input, and approval routing. The Project Engineer or Contract Engineer shall make a copy of the Hydrostatic Test Book and place it in the Project File while the original is being reviewed and approved.

The Central Files Administrator is responsible for maintaining the documentation management procedures contained herein and to maintain the Hydrostatic Test Books in Central Files.

It is the responsibility of the Drafting Coordinator to maintain the Hydrostatic Test Drawing files. Once the Hydrostatic Test Book has been approved, it is the responsibility of the Drafting Coordinator to update the drawings in the Hydrostatic Test Drawing files.

**TRAINING AND QUALIFICATION**

Performance of hydrostatic testing Operator Qualified “covered tasks” shall be in accordance with Tesoro Logistics LP. (TLLP) Operator Qualification Plan.

**DOCUMENTATION — Documentation Specified In The Standard Is Mandatory.**

**TESORO HYDROSTATIC TEST DESIGN AND PLANNING**

**Hydrostatic Test Design Specifications**

This section provides the Project Engineer or Contract Engineer planning considerations to perform hydrostatic testing. As applicable, all newly constructed or installed pipelines or existing pipelines that are relocated, replaced, or otherwise physically changed (excluding lowering) shall be hydrostatically tested before being placed in or returned to service (See either 49 CFR 195.302 or CFR 192.503, where applicable.).

**Summary of Pressure Test Requirements**

<b>LIQUID LINES</b>	<b>Minimum Test Pressure</b>	<b>Minimum Test Time (hrs.)</b>	<b>Controlling Regulation</b>
Non-DOT Jurisdictional Piping	Consult with Contract Engineer	Consult with Contract Engineer	ASME B31.4
Drain Lines open to atmospheric sumps(2)	100 psi w/ Air or Water	1	None



**BEULAH BASIN RAIL LOADING 10" PIPELINE PROJECT**

**CONSTRUCTION PROJECT DOCUMENT**

**MAY 19, 2014**

<b>LIQUID LINES</b>	<b>Minimum Test Pressure</b>	<b>Minimum Test Time (hrs.)</b>	<b>Controlling Regulation</b>	
	or Equivalent Static Test			
DOT Jurisdictional Piping			DOT 195 ASME B31.4	
Buried Pipe	1.25 x MOP 1.10 x MOP	4 4(1)	DOT 195 ASME B31.4	
Visually Examined Pipe Segments, Components, Etc.	1.25 x MOP	4	DOT 195 ASME B31.4	
<b>GAS LINES (Steel Pipe)</b>	<b>Minimum Test Pressure</b>	<b>Minimum Test Time (hrs.)</b>	<b>Controlling Regulation</b>	
MOP > 30 Percent of SMYS	1.10 x MOP	8	DOT 192 ASME B31.8	
Class 1 Locations <sup>(3) (4)</sup>			DOT 192 ASME B31.8	
Class 2 Locations <sup>(3) (4)</sup>		1.25 x MOP	8	DOT 192 ASME B31.8
Class 3 Locations <sup>(3)</sup>				DOT 192 ASME B31.8
Class 4 Locations <sup>(3)</sup>	1.50 x MOP	8	DOT 192 ASME B31.8	

1. Consideration shall be given to testing the piping for 8 continuous hours at a pressure equal to 125 percent, or more, of the maximum operating pressure (MOP) if conditions warrant.
2. Drain piping is not considered to be DOT Jurisdictional and operates at such a low percentage of yield strength that a hydrostatic test conducted in compliance with DOT 195 to confirm its integrity is not required. All threaded connections in the drain piping should be checked for leakage during the "Proof Test" or "Stand-Up Test." No formal documentation in the form of a test record shall be required for the "Proof Test" associated with drain piping open to atmospheric sumps.
3. For fabricated units and short sections of pipe for which a post-installation test is impractical, a pre-installation strength test must be conducted by maintaining the pressure at or above the test pressure for at least (4) hours.
4. See additional testing criteria for Class 1 and Class 2 locations in DOT 192.505(a) and (b).

**New or Existing DOT Jurisdictional Line Pipe / Station Piping:**

Station piping shall be hydrostatically tested to the flange rating of the new installation.

New line pipe and stock pipe shall be hydrostatically tested to a minimum of 90% of "SMYS."

Line pipe being installed into an existing line shall match the wall thickness, grade, and minimum test pressures of pipe immediately upstream and downstream of the installation.

**Bends**

Bends formed by "cold" processes (even those made with previously hydrostatically tested pipe) shall be hydrostatically tested after they are formed, prior to being placed in service.

**Components**

A component, other than pipe, that is the only item being replaced or added to the pipeline system need not be hydrostatically tested if the manufacturer certifies that either:

The component was tested to at least the test pressure required for the pipeline to which it is added, or

The component was manufactured under a "quality control system" as identified below that ensures that each item manufactured is at least equal in strength to a prototype and that the prototype was tested to at least the test pressure required for the pipeline to which it is added.

Pipeline components manufactured in accordance with the following standards do not require hydrostatic testing by Tesoro Logistics LP. (TLLP) when the component is the only item added to the pipeline.

<b>Manufacturing Standard</b>	<b>Components Covered</b>
API 6D	Valves, closures, swivels, and mechanical

	connectors
API 600	Steel gate and plug valves for refinery service
ASME Sec. VIII	Closures and pressure vessels
ANSI B16.5	Flanges, flanged valves, and fittings
ANSI B16.9	Weld-End fittings
MSS SP 44	High-Yield flanges
MSS SP 75	Weld-End fittings
ANSI B16.11	Screw-End fittings
ANSI B16.34	Weld -End valves

Pre-fabricated piping assemblies (including those made utilizing previously tested line pipe and components) shall be hydrostatically tested as a unit prior to installation. It is permissible to divide the piping into multiple test sections; however, the breaks should be made at flanged connections whenever possible. The welds not subject to hydrostatic testing should be limited to tie-in welds whenever practical and shall be non-destructively tested (radiograph or equivalent) in their entirety.

**Test Medium**

The test medium for Tesoro Logistics LP. (TLLP) should be water. An alternate medium may be used with the appropriate approval from the Engineering Manager. If a medium other than water is to be utilized on a DOT-Jurisdictional line for testing purposes, all applicable requirements as outlined under section CFR 195.306 or CFR 192.503 shall be met.

Tesoro Logistics LP. (TLLP) Health, Environment and Safety Department shall select or approve the sources of water to be used and may specify requirements for filtering, chemical treatment, and / or the use of additives such as corrosion inhibitors, leak-finding aids, etc.

The acquisition and disposal of test media shall be reviewed by Tesoro Logistics LP. (TLLP) Health, Environment and Safety Department Representative prior to executing the work to ensure all permits, (if necessary) have been acquired and limitations addressed.

**Hydrostatic Test Pressure and Duration**

For mainline piping, consideration shall be given to testing the entire section of piping to a minimum of 95% of the SMYS of the pipe where practical to provide for maximum future utilization of the pipe. For emergency stock pipe, the pipe should be tested to a minimum of 95% of yield strength unless the pipe is of sufficient diameter / wall thickness / grade combination that installed flange pressure ratings or test equipment

may actually limit the potential pressures the pipe could operate at. This is normally the case with small diameter pipe (<10-inch).

The following table lists the minimum test pressures for various ANSI-piping classifications. The strength of each piping component (pipe, valve, fittings, and flanges) to be tested must be considered in determining the ANSI classification and resultant hydrostatic test pressure.

<b>Standard Minimum / Maximum Test Pressures</b>		
<b>ANSI CLASSIFICATION (Liquid Lines)</b>	<b>MIN. TEST PRESSURE (psi) (ASME B31.4)</b>	<b>MAX. TEST PRESSURE (psi) (Recommended)</b>
ANSI 150 (IDP=285 psi)	356 psi	425 psi
ANSI 300 (MAOP=740 psi)	925 psi	1100 psi
ANSI 400 (IDP=990 psi)	1238 psi	1475 psi
ANSI 600* (MAOP=1480 psi)	1850 psi*	2200 psi*
ANSI 900* (IDP=2220 psi)	2775psi*	3300 psi*
ANSI 1500* (MAOP=3705 psi)	4630 psi*	5500 psi*
<b>ANSI CLASSIFICATION (GAS LINES)</b>	<b>MIN. TEST PRESSURE (psig) (ASME B31.8)</b>	<b>MAX. TEST PRESSURE (psig) (Recommended)</b>
ANSI 150 (IDP=275 psi)	Class 1: 303 psi Class 2: 344 psi Classes 3 and 4: 413 psi	Class 1: 353 psi Class 2: 394 psi Classes 3 and 4: 463 psi
ANSI 300 (MAOP=720 psi)	Class 1: 792 psi Class 2: 900 psi Classes 3 and 4: 1080 psi	Class 1: 842 psi Class 2: 950 psi Classes 3 and 4: 1130 psi
ANSI 600* (IDP=1440 psi)	Class 1: 1584 psi* Class 2: 1800 psi* Classes 3 and 4: 2160 psi*	Class 1: 1634 psi* Class 2: 1850 psi* Classes 3 and 4: 2210 psi*

ANSI 900* (IDP=2160 psi)	Class 1: 2376 psi* Class 2: 2700 psi* Classes 3 and 4: 3240 psi*	Class 1: 2426 psi* Class 2: 2750 psi* Classes 3 and 4: 3290 psi*
ANSI 1500* (IDP=3600 psi)	Class 1: 3960 psi* Class 2: 4500 psi* Classes 3 and 4: 5400 psi*	Class 1: 3410 psi* Class 2: 4550 psi* Classes 3 and 4: 5450 psi*

**\*NOTE:** For pipe 14 inches in diameter or greater, caution should be used in utilizing these pressures since the flange hub may limit IDP of the flange. Specify calculated values for minimum and maximum test pressures that comply with MSS-SP-44 “Steel Pipeline Flanges.”

**Buried Pipe Segments**

The test duration for buried pipe segments that is required by regulations for liquid pipelines is at least 4 continuous hours at a pressure equal to 125 percent or more of the maximum operating pressure (MOP) and additional 4 continuous hours at a pressure equal to 110 percent or more of the MOP. Consideration shall be given to testing the piping for 8 continuous hours at a pressure equal to 125 percent or more of the maximum operating pressure (MOP) when conditions warrant.

**Exposed Pipe Segments, Assemblies, and Components**

The test duration for exposed pipe, assemblies, and components (when all the piping can be visually examined for leakage during the test) shall be at least 4 continuous hours at a pressure equal to 125 percent or more of the maximum operating pressure (MOP).

**Above Ground Storage Tanks**

Design and procedural requirements for hydrostatic testing above ground storage tanks shall be conducted and documented in accordance with Tesoro Logistics LP. (TLLP) storage tank Standards.

**Maximum Allowed Test Pressures**

The maximum allowed test pressures on piping subject to a hydrostatic test should **not** exceed **98%** of SMYS for any piping under test, nor should it exceed **1.5** times the MAOP of any flanges without prior approval from the Engineering Manager.

**Hydrostatic Test Design and Planning Process and Documentation**

**Purpose**

This section provides the Project Engineer or Contract Engineer with guidelines to ensure uniform procedures for designing and planning and documenting hydrostatic tests for new construction, existing pipelines, station piping and associated appurtenances, and emergency stock pipe in accordance with the Department of Transportation (DOT) 49 CFR 195.300 Subpart-E — Pressure Testing, Department of

Transportation (DOT) 49 CFR 192.500 Subpart-J — Testing Requirements, and Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP).

To ensure uniformity of design and planning and documentation, a Hydrostatic Test Book and all its specified attachments shall be compiled for all DOT and non-DOT Jurisdictional hydrostatic tests. The Hydrostatic Test Book shall be prepared by the Project Engineer or Contract Engineer with the following tabs

- Hydrostatic Test Review
- Hydrostatic Test Index
- Hydrostatic Test Drawing
- Pipeline Pressure Test Record Narrative
- Hydrostatic Test Plan Pressure / Temperature Charts (original and copy)
- Calibration Certificates
- Deadweight Tester
- Chart Recorder
- Temperature and / or Pressure probes, etc

***Supporting Drawings (as applicable)***

- DOT Jurisdictional Drawing Mark-Up
- Hydrostatic Test Drawing Mark-Up
- Hydrostatic Test Configuration Drawing
- Pressure Control Section Drawing Mark-Up
- Revised MOP Profile
- Two-Line Piping Installation Mark-Up,
- Alignment Sheet Drawing Mark-Up
- Mainline Pipe Installation Mark-Up
- Hydrostatic Test Qualification Calculations
- Constrained Pipe Qualification Calculation
- Pipe Installation Summary
- Pipe Installation Summary
- Failure Analysis / Records
- Hydrostatic Test Failure Record
- Purchase Orders
- Material Test Reports (MTR)
- Operator Qualifications
- Field Notes
- The Hydrostatic Test Review
- Hydrostatic Test Index

- Hydrostatic Test Drawing

The Hydrostatic test book shall also include are Tesoro Logistics LP. (TLLP) records that ensures the hydrostatic test record created by Tesoro complies with Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP) and Tesoro's Integrity Management Program governing the content of such records.

The Pipeline Pressure Test Record and all its specified attachments, is Tesoro's record of the pressure test of the pipelines and / or pipeline facilities that meets the Department of Transportation regulations, industry standards, and TESORO policies, procedures, and practices. The Pipeline Pressure Test Record shall be completed for all pressure tests, and filed under the appropriate tab in the Hydrostatic Test Book.

Once the hydrostatic test has been completed, the Hydrostatic Test Review, and Hydrostatic Test Drawing shall be updated to ensure compliance with Tesoro's Integrity Management Plan. A separate Form shall be required for each test conducted.

If the test includes pipe that will be installed at different locations or facilities, or are made of more than one line or line section, a Hydrostatic Test Forms shall be required to be completed for each location, facility, or line section tested.

The hydrostatic test data should be recorded on the second and or third pages of the Form. All required support documents shall be attached to the Form.

Narrative — A 'Narrative' shall be required for all 'constrained' (below-ground) tests and for all tests for which a 'failure' occurred. The Narrative should include a brief discussion of the test preparation, including date of the test, the duration of the test, a discussion of any failures occurring during the test, an explanation of any pressure discontinuities that appear on the charts, and personnel involved with the hydrostatic test, etc. A copy of the Hydrostatic Test Plan (Critical Task Analysis) with a column added to document actual times, events, and results of the test may be considered as adequate.

The Hydrostatic Test Plan should provide the following minimum information: A detailed Hydrostatic Test Plan shall be required for all DOT Jurisdictional constrained (buried) line pipe and station pipe test segments including Hydrostatic Test Plan Template, drawings supported by tables showing the test segments or assemblies, the location of the Deadweight Tester and injection points, and the minimum and maximum test pressures and minimum durations for each test segment.

The calculations utilized to determine the minimum and maximum target test pressures.

For pipelines where the elevation change is greater than one-hundred feet, elevation profiles showing the test limits and the hydraulic elevation gradient for each test segment supported by the calculations used to determine the pressure limits.

Isolation drawings showing the locations of all valves, valve requiring removal, blinds, and equipment to be locked-out and tagged-out (LO/TO), highlighting the weakest link or controlling component in each test section.

Valve listing specifying the station number or location, the type, size, ANSI pressure rating, manufacturer, and serial number of all valves tested and removed under the plan.

Test medium type and volume required (line fill plus failure contingency volumes) including acquisition, handling, and disposal to ensure an adequate supply of test medium to fill the line section, assembly or component.

A detailed Project Execution Plan including Critical Task Analysis annotated with applicable Operator Qualification and environmental and safety precautions and procedures.

A Commissioning, Decommissioning, and Re-Commissioning Plan shall be included.

A Purge Plan to purge the pipeline of its residual content, to ensure the section being tested is completely filled with the test medium, and to ensure test medium's removal at the end of the test.

Pressure / Temperature Charts and Data — A Pipeline Hydrostatic Test Sticker shall be filled out and placed on the back of *each* chart to ensure all required data for the hydrostatic test is collected. Pressure / temperature charts are to be certified by the person responsible for the test by placing their signature on the front of the chart and sticker.

Calibration Certificates (Deadweight Tester, Chart Recorder, Temperature and or Pressure probes, etc.) — The latest calibration certificates are required for the deadweight tester and all recorders (pressure and temperature), and probes.

**\*\* The calibration date must be no more than one year prior to the hydrostatic test date.**

Operator Qualifications — The Operator Qualifications for both the hydrostatic test technician and supervising Inspector shall be included as part of the test record.

Hydrostatic Test Design and Planning Process

The flowchart "Hydrostatic Test Design and Implementation", shows the overall design and planning, execution, documentation, and review and approval process for all Tesoro Logistics LP, (TLLP) hydrostatic tests.

The Project Engineer or Contract Engineer shall get copies of the (1) Hydrostatic Test Drawing and supporting piping drawings

Using the Hydrostatic Test Drawing and piping drawings as a base, The Project Engineer or Contract Engineer shall create the Hydrostatic Test Drawing Mark-Up by delineating the limits of each test section annotating each test segment with the following information:

- Date
- Description (including the Field Test Number)
- ANSI Piping Classification
- Minimum Test Pressure (psi)
- 0.80 X Minimum Test Pressure (psi)
- AFE/Project #
- Comments

The Project Engineer or Contract Engineer shall complete the Design Data section of the Hydrostatic Test Pressure Record (See Appendices) including attachments, Assign the Hydrostatic Test Number to the test and complete the summary information.

If the Design Data lowers the MOP of the piping, the Engineering Department shall forward the information to the Operation Department for approval.

Once the Design Data has been approved, the Engineering Department shall forward the signed Hydrostatic Test Pressure Record (See Appendices) to operations as approval to proceed with the hydrostatic test.

### **Hydrostatic Test Execution**

This section provides the Mechanical / Testing Contractor, Inspector, and Project Engineer or Contractor Engineer with the specifications for the performance of hydrostatic testing to ensure uniform testing of new construction, existing pipelines, station piping and associated appurtenances, and emergency stock pipe in accordance with the Department of Transportation (DOT) 49 CFR 195.300 Subpart-E — Pressure Testing, Department of Transportation (DOT) 49 CFR 192.500 Subpart-J — Testing Requirements, and Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP).

### **Hydrostatic Test Execution Specifications**

A Hydrostatic Test Plan shall be required for all DOT Jurisdictional and non-DOT Jurisdictional 'constrained' (buried) pipelines and station pipe test segments.

The Project Engineer or Contract Engineer shall prepare the Hydrostatic Test Plan covering all existing pipelines, pipeline segment, and station piping.

The Mechanical Contractor shall prepare the Hydrostatic Test Plan for all new pipeline and station construction.

Tesoro's Operations shall be responsible for the commissioning, decommissioning and re-commissioning of all Tesoro's existing pipeline, segments of pipelines and stations.

Decommissioning covers all activities required to remove the system from active service including the removal of liquid from the system to the extent that no release will occur while the system is being taken out-of-service. Re-Commissioning covers all activities required to return the system to active service.

The Engineering Department shall be responsible for writing the Commissioning, Decommissioning, and Re-Commissioning plan portions of the Hydrostatic Test Plan.

Tesoro's Lock-Out / Tag-Out (LO/TO) Plan and Procedures shall be followed at all times.

### **The Operations shall ensure**

- Sufficient personnel are on site to conduct the commissioning, decommissioning, and re-commissioning activities.
- Serviceability of the valves, gauges, etc., scheduled for use in the performance of the decommissioning / drain-up and re-commissioning activities.
- Piping section being tested is isolated in accordance with the Hydrostatic Test Plan and Commissioning, Decommissioning, and Re-Commissioning Plan.

- All equipment or energy-storing devices are locked-out and tagged-out in accordance with the Hydrostatic Test Plan — Critical Task Analysis, Commissioning, Decommissioning, and Re-Commissioning Plan, and Tesoro's Lock-Out / Tag-Out (LO/TO) Plan and Procedures.
- All rectifiers attached to piping under test are turned-off, locked-out and tagged-out in accordance with the Hydrostatic Test Plan, Commissioning, Decommissioning, and Re-Commissioning Plan, and Tesoro's Lock-Out / Tag-Out (LO/TO) Plan and Procedures.
- All main line and station valves that will be included in the hydrostatic test shall be positioned flagged open, and physically inspected during the period of the test for stem leakage or leakage of auxiliary piping.

Mechanical Contractor / Testing Contractor shall place Contractor LO/TO at all locations locked out and tagged out by Operations.

Operations shall approve the installation of all temporary blind flanges, or weld caps, at the locations shown by Hydrostatic Test Plan to isolate the test section.

The Testing Contractor is responsible for adhering to the following hydrostatic testing specifications.

Testing Contractor shall be responsible for knowing and completing the hydrostatic test documentation requirements outlined in this Standard, and providing the TESORO with the required information in a timeframe designated by the TESORO.

Testing Contractor shall furnish as a minimum the following instruments for the hydrostatic testing:

- Deadweight tester appropriate for the test pressure specified and calibrated to a maximum of one (1) pound increments.
- Calibrated pressure recording instruments appropriate for the test pressure specified, with a minimum 10-inch, 24-hour rotating chart with 50 psi maximum increments, or a strip chart recorder which can be read to the same resolution. Testing Contractor shall ensure that the chart recorder pens provide a clear and distinct trace.
- Calibrated temperature measuring and recording instruments with a range of 0 - 150 degrees F with 10 degree F maximum increments, with a minimum 10 - inch, 24 hour rotating chart (or strip chart of same resolution) for recording line temperature.

All testing instruments, including pressure gauges, pressure recorders, pressure indicators, temperature gauges, thermometers, and temperature recorder shall be calibrated within the past 12 months prior to use. Certification of equipment calibration shall be provided to TESORO prior to the beginning of the test.

The test instruments shall be installed at, or near the point where the line is filled or at the pressure location as directed by TESORO. These instruments shall be manned at all times when the line is under test unless more than one set of instruments is installed on the same test section for redundancy.

TESORO may install, at its option, the TESORO's deadweight tester or other equipment to monitor the equipment installed by Testing Contractor. The Testing Contractor shall provide the necessary connection points.

All equipment and materials supplied for hydrostatic testing by Testing Contractor shall meet the approval of TESORO prior to being used; all equipment shall be properly selected and maintained in good working condition. Pumping equipment shall have safety relief valves to prevent over-pressurizing beyond the specified test pressure. The relief valves shall be set at the specified test pressure plus 5%.

Water shall be used as the test medium. Specific deviations are allowed under 49 CFR195, Section 195.306 for certain types of lines. TESORO may approve alternate test mediums on a case-by-case basis.

Water to be used in the test shall be clean, fresh filtered water as approved by TESORO. A sample will be furnished to TESORO for analysis upon request. Testing Contractor shall work with TESORO's Health, Environmental & Safety Representative to coordinate the discharge permit unless otherwise noted by TESORO. Testing Contractor shall not discharge water without a discharge permit.

Once the water has been placed into the mainline or station test section(s), samples shall be pulled for analysis. Two to three samples shall be required for all mainline tests (head end, tail end, and mid-point if possible). At the discretion of Tesoro's Health, Environmental and Safety Representative, station piping tests may or may not require a water sample to be pulled.

The TESORO's Health, Environmental and Safety Representative shall coordinate sampling testing. Samples shall be delivered to the assigned laboratory as soon as possible. Hydrostatic testing shall proceed only after confirmation of receipt and, or test results from the Health, Environmental and Safety Representative.

After the pipeline segment is filled with water and all recording instruments indicate that the temperature and pressure in the pipeline have stabilized and the pipeline has had all air bled, Testing Contractor shall pressurize the line with the pressurizing pump, maintaining continuous surveillance over the operation to ensure that the pressure does not exceed the maximum specified test pressure.

After the specified test pressure is obtained and pumping has stopped, the pressurizing pump shall be disconnected or its connection to the line shall be blocked, and the piping connections to the pipeline shall be inspected for leakage. Once the piping has been inspected, the Testing Contractor shall start the hydrostatic test on the ¼-hour.

For 'constrained pipe' (buried), the specified test pressure shall be held for a period of 8 hours (4 continuous hours at a minimum of 125% of MOP and 4 continuous hours at a minimum of 110% of MOP or 8 continuous hours at a minimum of 125% of MOP).

For exposed and visible pipe, the specified test pressure shall be held for a period of 4-hour at a minimum 125% of MOP.

For all hydrostatic tests, the pressure and temperature readings shall be recorded, pressure and temperature recorders run continuously, and the specified test pressure verified as being maintained.

The Testing Contractor shall provided a means to accurately inject / collect and measure the amount of 'fluid-add' and 'fluid-bleed' (measured to the nearest 1/3 fluid ounce (or

0.01 liters). In the event that the Testing Contractor does not provide an accurate means of injecting, collecting, and measuring, the Testing Contractor shall bear all the costs associated with any delay, including delays resulting in missing the scheduled pipeline testing window.

In the event of testing equipment failure, all costs of repairing and re-pressuring shall be borne by Testing Contractor, including delays resulting in missing scheduled pipeline testing window.

The Testing Contractor shall provide one or more back-up temperature probe / recorder on-site in the event of a temperature probe failure.

Testing Contractor shall insure that during the test, the test head is protected and / or shaded from the elements to minimize the temperature / pressure effect on the system.

Testing Contractor shall place the constrained pipe (ground) temperature probe along the pipe at least two feet back from the cut, covered by a minimum of two (2) feet of earth.

Testing Contractor shall place the unconstrained pipe (exposed) temperature probe on the pipe to be out of direct sunlight for the entire test period.

Dead-weight tester pressure recorder checks shall be made at the commencement, middle, and termination of the test period. The results of the dead-weight tester checks shall be recorded on the Pipeline Pressure Test Record.

The test pressure and temperature recorders shall be set to real time and all additional pressure / temperature and temperature chart recorder shall be time synchronized.

The Testing Contractor's technician shall take and record the test pressure and temperature data on the Pipeline Pressure Test Record with the following minimum information:

- Time
- Deadweight pressure
- Pressure gage indicator reading (as applicable)
- Volume of 'fluid-add'
- Volume of 'fluid bleed'
- Corresponding pressure change resulting from 'fluid-adds' and 'bleeds' (record from and to)
- Constrained pipe (ground) temperature probe values, probes
- Unconstrained pipe (exposed) temperature probe values, probes
- Ambient air temperature
- Pressure reading difference between the dead-weight and the pressure
- Chart recorder at the beginning, middle, and end of the test.

For each constrained (buried) pipe hydrostatic test, Testing Contractors shall provide the TESORO a copy of the Pipeline Pressure Test Record times, test pressures, test temperatures, 'fluid-add' and 'fluid-bleed' volumes, pressure-temperature variation calculations, and test notes, for analysis and hydrostatic test approval.

The Testing Contractors shall not terminate the hydrostatic test until the Tesoro has approved the test, or provided further instruction.

A complete record of leaks and failures occurring during the test shall be maintained. The record shall include the exact location, calculated, or observed pressure at the location of the failure / leak, type and cause of failure, method of repair, etc. All records shall be submitted to TESORO for approval and retention.

If during the test period a drop in pressure associated with a leak should occur, Testing Contractors shall search for leaks, de-pressure, and de-water the line to the extent necessary to repair the leak (s).

After a leak has been repaired, the line shall be refilled and the pressurizing process as outlined previously shall be performed again. The above testing process shall be repeated until all leaks are permanently repaired and the specified test pressure can be satisfactorily maintained following the specification.

For new construction, leaks and failures resulting from poor workmanship on the part of Mechanical Contractor (leaks that cannot be ascribed to inherent mechanical or metallurgical deficiencies) shall be repaired as directed by TESORO and all costs of repairing, re-pressuring, and re-testing shall be borne by Mechanical Contractor.

For leaks caused by exceeding the specified maximum test pressure by 10 psig or more, as indicated by the pressure recording devices, shall be termed poor workmanship on the part of the Testing Contractor and all costs of repairing, re-pressuring and re-testing shall be borne by Testing Contractor.

In the event of freezing temperature, Testing Contractor shall prevent freezing of test lines and above-grade piping. Testing Contractor shall provide bales of straw, heaters, and canvas tents to cover areas of pipe that are susceptible to freezing during the hydrostatic test. No anti-freeze or equal shall be added to the test water unless approved by TESORO.

All temporary installations / connections, etc., shall be dismantled and the pipeline shall be brought into its permanent state by the Testing Contractor.

Testing Contractor shall leave the premises clean and in the same conditions as existed prior to running the tests.

#### Hydrostatic Test Execution

The Inspector shall ensure that the Testing Contractor meets all the requirements of this Standard.

Prior to beginning the hydrostatic test, the Inspector shall file or cause to be filed the following applicable documentation under the appropriate tab in the Hydrostatic Test Book:

- Operator Qualification as required by Tesoro Logistics LP. (TLLP) Operator Qualification Plan for both the Inspector and Testing Contractor's technician — all tests.
- Calibration Certifications for the Dead-weight Tester, Chart Recorder (s), and temperature probes (and chart recorders) — all tests.
- A Pipe Installation Summary giving for each diameter pipe, the grade, wall thickness, and heat number, and a similar tally of high-yield fitting and flanges

including the heat numbers — all new construction and modifications to existing piping.

- The MTR for each heat number including high-yield fittings and flanges — all new construction and modifications to existing piping.
- Copies of the Purchase Order (or equivalent) for all pipe and high-yield fittings and flanges — all new construction and modifications to existing piping.
- Hydrostatic Test Plan — mandatory for all constrained (buried) pipe tests.

**Prior to the beginning of the hydrostatic test, the Inspector shall**

- Confirm that the test water source is in accordance with Hydrostatic Test Plan and applicable permits.
- Ensure that the test water sample kits are available for collecting discharge water samples in accordance with permits. (If applicable)
- Ensure that the Mechanical or Testing Contractor gathers all necessary water samples required by the *NPDES* – National Pollutant Discharge Elimination System, sampling program and other applicable permits.  
(If applicable)
- Ensure failure samples shall be appropriately handled and labeled in accordance with *NPDES* sampling program and other applicable permits.
- Ensure that all frac-tanks to be used have secondary spill containment in place.
- Verify that the test pressures are appropriate for the facility to be tested, in accordance with the approved Hydrostatic Test Plan.
- Ensure that the test duration is in accordance with 49 CFR Part 195, Subpart-E, 195.304 – Test Pressure or Department of Transportation (DOT) 49 CFR 192.500, Subpart-J — Testing Requirements.
- Verify that hydrostatic testing equipment (deadweight tester, recorders, temperature probes, etc.) satisfies the minimum acceptance criterion identified in this Standard.
- Verify the range for the deadweight tester and chart recorder are appropriate for test planned
- Ensure the hydrostatic test technician understands that the minimum test pressure at the deadweight shall not be allowed to fall below the established minimum test pressure as defined in the Pipeline Pressure Test Record, nor rise above the established maximum test pressure.
- Ensure the chart recorder pens are providing a clear and distinct trace.
- Ensure the testing contractor has provided a means to accurately inject / collect and measure the amount of ‘fluid-add’ and ‘fluid-bleed’ (measured to the nearest 1/3 fluid ounce (or 0.01 liters).
- Verify the Testing Contractor has one or more back-up temperatures

probes on site in the event of a temperature probe failure.

- Verify all temperature probes are calibrated.
- Ensure that the constrained pipe (ground) temperature probe is placed along the pipe at least two (2) feet back from the cut and covered by a minimum of two (2) feet of earth.
- Ensure that the unconstrained pipe (exposed) temperature probe is placed on the pipe out of direct sunlight for the entire test period.
- Confirm ambient air temperature probe is calibrated.
- Confirm all air has been bled from the test section and the system has been allowed to equilibrate prior to the start of the test.
- Verify test head is protected and / or shaded from the elements.
- Verify the Testing Contractor has taken steps to prevent freezing of test lines and above grade piping.
- Confirm that biocide, tracer gas, anti-freeze, etc. are used in accordance with the Hydrostatic Test Plan.
- Verify all pressure / temperature and additional temperature chart recorder are time synchronized.
- Ensure the hydrostatic testing technician completes the Pipeline Pressure Test Record with the following minimum information:
  - time
  - dead-weight pressure
  - pressure indicator reading
  - volume of 'fluid-add'
  - volume of 'fluid bleed'
  - corresponding pressure change from 'fluid-adds' and 'bleeds' (record from and to)
  - constrained pipe (ground) temperature probe values 1, 2, 3, etc. as applicable
  - unconstrained pipe (exposed) temperature probe values 1, 2, 3, etc., as applicable
  - ambient air temperature
  - pressure reading difference between the dead-weight and the pressure chart recorder at the beginning, middle, and end of the test.
- Inspect all Mechanical / Testing Contractor's supplied hoses, valves, fittings, etc., prior to hydrostatic testing to ensure that materials are adequate for the pressure rating and in good condition.

- Conduct the Hydrostatic Test Safety review at the morning tailgate meeting.

**During the Hydrostatic Test**

- Ensure that personnel keep as much distance as possible between them and the facility under test.
- Witness initial pressurization, taking deadweight readings, bleed-offs, pump-ups, and stroke vs. pressure readings.
- Visually inspect above ground piping, flanges, valves, appurtenances, Etc. and record the findings under the Comments section of the Pipeline Pressure Test Record.
- Ensure that the specified hydrostatic test pressure range is maintained during the hydrostatic testing period.
- Verify that the Mechanical or Testing Contractor logs the 'fluid bleeds' and 'fluid-adds' required to maintain the pressure within the desired range.
- Conduct a real time QA / QC hydrostatic test procedures and data gathering by the hydrostatic test technician and helpers. For constrained (buried) tests, the Inspector shall monitor the pressure recording charts for unexplained pressure drops, and calculate and compare the predicted pressure change (based on volume change — 'fluid-adds and bleeds') to the measured pressure changes recorded by the deadweight tester.
- Ensure that all failures and leaks are documented following this Standard.

**After the Hydrostatic Test**

- QA / QC the hydrostatic test data provided by the Testing Contractor and complete the Pipeline Pressure Test Record.
- Confirm that a "Pipeline Qualification Test" Sticker has been placed on the back of the test charts.
- Confirm that the discharge of hydrostatic test water is in accordance with the approved Hydrostatic Test Plan, NPDES permit, and Health, Environmental & Safety requirements.
- Monitor dewatering operations.
- Construct a detailed isometric drawing showing the piping and location of the test head, 'air bleeds', temperature probes, etc., and document the test with annotated digital photography. For tests that include pipe for installation at multiple locations, the Inspector shall create separate isometric drawings of the actual test and installation drawing for each piece installed.

After the hydrostatic test has been completed, the Project Engineer or Contract Engineer is responsible for adhering to the following hydrostatic testing specifications.

The Project Engineer shall QA / QC the hydrostatic test data (test log, chart, chart stickers, etc.) collected by the Inspector for clarity, accuracy, and completeness, and file or cause them to be filed under the appropriate tab in Hydrostatic Test Book.

Upon completion of the test, the Project Engineer shall write the Project Narrative and file it under the appropriate tab in Hydrostatic Test Book.

#### Leak Repair and Failure Preservation / Documentation

This section provides the Mechanical Contractor, Testing Contractor, Inspector, Contract Engineer and Project Engineer guidelines for the repair and documentation of leaks.

The Mechanical Contractor shall be responsible for making the One Call Notification for all dig locations.

The Project Engineer or Contract Engineer shall be responsible for immediately notifying Tesoro's Environmental, Safety and Regulatory Representative of all leak locations in order to initiate land TESORO notifications.

Fixing leaks, leaking gaskets, connections, etc. while the line is pressurized **shall not be allowed** without prior approval from the Operations..

Once a leak or failure has been found, the method for repairing the leak permanently or temporarily and the pressure at which the repair method shall occur shall be determined and approved by Engineering Department.

All fittings and valves that are replaced during the test because of inherent mechanical or metallurgical deficiencies shall be reported to the Operations together with the location and pressure at which they failed. Such materials shall be tagged and delivered to an TESORO-designated storage area for further examination and final disposition.

For leaks found within the pipe wall of existing pipe due to corrosion, the repair technique as well as the amount of pipe replaced at the location shall be determined by Engineering Department.

When leaks occur in circumferential welds, the method of repair shall be determined by Engineering Department.

Project Engineer or Contract Engineer shall identify all failed pipe, flange, fitting, valve, and appurtenance specimens to be collected for failure analysis. For proper analysis, the specimen must be properly identified and the failed pipe, particularly the fracture surface, must be protected from corrosion and other *damage*.

- On all failures requiring cutout, a photograph shall be taken and a sketch made of the specimen in-place by the Inspector before the pipe is disturbed. Photographs should also be taken after the pipe is removed from the ditch and also at the central storage site. Each photograph shall be marked with test section and failure number, as well as the date and time the photograph was taken.
- On all failures requiring cutout, the top of the pipe (12 o'clock position), direction of flow (arrow pointing downstream) and a "North" arrow are to be marked with a paint marker or other indelible marker. In addition, failures are to be circled, with care being taken not to get paint or ink on the failure. Hydrostatic test failures are to be identified sequentially by test section, failure number, and milepost and / or station number. The name of the person and TESORO gathering the pipe

specimen, the station number, test section and failure numbers are to be written on pipe.

- As soon as is practical after excavation or exposures of the failure segment, the fracture surfaces are to be coated with a light, water-dispersing oil, such as Vaseline or motor oil. During subsequent handling, it is essential that failure surfaces not be damaged or contaminated. No attempt shall be made to clean the failure surfaces other than to remove mud with water. The failure surfaces should not be rubbed, brushed, sandblasted, or otherwise contacted. After the failed segment of pipe has been removed from the line and treated as described above, the segment should be wrapped and taped in a water resistant film such as polyethylene to prevent contamination during transport and storage. The plastic film should be positioned on the failure segment so as to permit access to the failure surfaces for examination or reapplication of the oil coating.
- Extreme care should be exercised to prevent digging tool contact with the pipe near the failure surface during excavation. In handling the pipe, no hooks, chains, slings, or similar metal devices are to contact the pipe at a failure location.
- All torch and or cold cuts shall be a minimum of six inches from any failure surface.
- Each failure cutout shall be taken to a central storage location for subsequent visual examination. It is essential that all failures be protected from mechanical damage during handling and transportation, and that the oil coating is replenished as frequently as necessary to maintain coverage and prevent corrosion. The samples are to be stored in such a manner that failures are accessible for visual examination.
- For each failure, the following applicable information will be reported.
  1. Test section
  2. Failure number
  3. Date and time of failure
  4. Location of failure (milepost and/or station number)
  5. Pressure at failure location
  6. Length of pipe replaced
  7. Description of the failure (pipe seam, pipe body, girth weld, etc.)
  8. Width, length of failure, and clock position.

Pipe description including diameter, wall thickness, seam type, manufacturer, and date.

The failure pressure to be reported is the calculated failure pressure at the location of the failure considering elevation. Under "Description of Failure," it should be reported whether the failure was a leak or a rupture and whether it was in the longitudinal weld, girth weld, or pipe body. The Hydrostatic Test Failure Record shall be used to document the conditions at the time of failure. The Hydrostatic Test Failure Record should be made a part of the permanent hydrostatic test record and filed in the Hydrostatic Test Book.

Pipeline / Station Piping Cleaning, Drying, and Commissioning / Re-Commissioning

Mechanical Contractor shall supply all equipment necessary to dewater and clean the line to meet the requirements of this specification including all test instruments to indicate that the provisions are being met.

For new pipeline construction — upon completion of the hydrostatic test, the Mechanical Contractor shall pass a pig through the pipeline using good sealing cup or disc pigs acceptable to TESORO. Mechanical Contractor shall use nitrogen for propelling pigs. Mechanical Contractor shall perform as many pig runs as are required to remove water from the line, subject to TESORO approval. The pig velocity shall not exceed 3 feet per second.

For existing pipeline, batching pigs or a combination of batching pigs and disk pigs shall be used to separate and isolate the test water placement across the test section(s) from the product or crude normally used in the line. The pig velocity shall not exceed 3 feet per second.

After acceptance by TESORO of dewatering and cleaning, the pipe shall be closed to prevent the ingress of foreign substances into the pipeline.

Mechanical Contractor shall ensure that:

- All freeze plugs have been removed.
- All isolation devices installed during the decommissioning are removed.
- All blind flanges are removed, and all valves or spool pieces are re-installed.
- All valves are turned to the closed operating position.
- All Contractor Lock-Out and Tag-Out devices have been removed.

Hydrostatic Test Execution Documentation Process

The Testing Contractor shall complete the Test Pressure and Temperature sections of the Pipeline Pressure Test Record, annotate the Hydrostatic Test Stickers and affix it them to the appropriate charts, and sign and date the Pipeline Pressure Test Record, and Hydrostatic Test Stickers in the appropriate locations.

The hydrostatic tests records shall be delivered to the Project Engineer or Contract Engineer, or Inspector upon the completion of the hydrostatic test.

The Project Engineer or Contract Engineer shall QA / QC all hydrostatic test records generated in the field and file them in Hydrostatic Test Book.

Hydrostatic Test Record Quality Assurance and Control, Archival, and Distribution Processes

Purpose — to provide Project Engineer or Contract Engineer with a standardized process of hydrostatic records management in accordance to Tesoro Logistics LP. (TLLP) "Integrity Management Program," the Department of Transportation (DOT) Integrity Management Program (IMP) 49 CFR 195.452, and API 1160 — "Managing System Integrity for Hazardous Liquid Pipelines."

The objective is to ensure that hydrostatic test documentation has been properly reviewed and approved for completeness and accuracy.

The review, quality assurance and control, and documentation process is summarized in the "Hydrostatic Test Book Review Flowchart".

The Hydrostatic Test Book is Tesoro Logistics LP. (TLLP) record of the hydrostatic test and ensures that the record created by Tesoro complies with current Department of Transportation (DOT) 49 CFR 195.300 Subpart-E — Pressure Testing and the Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP), and Tesoro Logistics LP. (TLLP) "Integrity Management Program" governing the content of such records.

This Standard and "Hydrostatic Test Review" shall be used for the review of new hydrostatic test records and the assessment of pre-existing hydrostatic test records of mainline pipelines, station piping, and emergency stock pipe.

The Project Engineer shall complete the "Hydrostatic Test Review" of the Hydrostatic Test Book to verify if all the necessary information has been included in the test record. The completion of the "Pressure Test Record Review" is Tesoro's process that ensures the Hydrostatic Test Book is complete, and can be used to assess the adequacy of exiting records.

The "Hydrostatic Test Review" (See Appendices) was designed to meet the requirements set forth in Department of Transportation (DOT) 49 CFR 195.300 Subpart-E — Pressure Testing.

The Department of Transportation (DOT) Required Information (Information Required After 1/8/1971, Items 1 through 9) identifies the specific requirements that should be present in a 'complete' hydrostatic test record as specified by Department of Transportation (DOT) 49 CFR 195.300 Subpart-E — Pressure Testing.

Pressure Recording Charts — Pressure recording charts were required with the first promulgation of 49 CFR 195.310 (Federal Register, Volume 35, No. 219, November 7, 1970, page 17183).

#### ***Test Instrument Calibration Data***

- A log of pressure readings is required for all tests performed after 1/8/1971. A 'log' is normally considered to be data recorded during the test at equally spaced time intervals. For pressure tests performed prior to 1/8/1971, the Office of Pipeline Safety (OPS) has indicated that any record (documentation or data) may be used to show that an acceptable test was conducted; however, such records must have been made at the time of the test and result directly from the testing.
- Calibration Certification data and or Serial Number for the deadweight tester (or equivalent) is required for all test performed after 10/21/1985 ((Federal Register, Volume 50, Number 165, August 26, 1985, page 34470).

#### **Operator Identified**

- If the 'operator's name' is not specifically listed in the test record, Tesoro Logistics LP (TLLP) shall be the designated operator.
- Indicate 'Yes' if the records show the name of any individual.
- If the records do not show the name of a third-party test TESORO indicate 'No.' If the records do not show the test TESORO's name, Tesoro Logistics LP (TLLP) shall be the designated test TESORO, and 'N/A' should be indicated.

**Minimum Test Duration**

- The effective date for the original Subpart E Hydrostatic Testing Requirements is 1/8/1971. The minimum test duration for tests performed prior to 1/8/1971 is 8 hours when all piping was not visually inspected during the test and 4 hours when all piping was visually inspected for leakage during the test.
- Between 1/8/1971 and 9/8/1980, all newly installed piping was required to be tested for a minimum duration of 24 hours.
- After 9/8/80, piping that is subject to testing requirements of Subpart-E and can be visually inspected during the test must be tested for a minimum of four (4) continuous hours at a pressure equal to 125% or more of the maximum operating pressure (Federal Register, Volume 45, No.175, September 8, 1980, page 59166). After 9/8/1980 in the case of piping that cannot be visually inspected for leakage, the piping that is subjected to testing requirements of Subpart-E shall be tested for an additional four (4) continuous hours at a pressure equal to 110% or more of the maximum operating pressure (Federal Register, Vol. 45, No.175, September 8, 1980, page 59166).

**Minimum Test Pressure** — the minimum test pressure noted on the test review form is the minimum test pressure recorded at the deadweight tester, and is dependent upon when the test was performed.

- For a hydrostatic test performed before 1/8/1971, the minimum test pressure shall be the highest minimum test pressure in any 8-hour window identified in the test record.
- For a hydrostatic test performed between 1/8/1971 and 9/8/1980, the minimum test pressure that occurred during the 24 hour period is to be utilized as the minimum test pressure.
- For a hydrostatic test performed after 9/8/1980 at 125% or more of the MOP where the pipe could not have been visually inspected for leakage for a minimum of 8 continuous hours or 4 continuous hours where pipe is visually inspected during the test, the minimum test pressure is the minimum pressure during the test period.
- For a hydrostatic test performed after 9/8/1980 and where the pipe could not have been visually inspected for leakage during the first 4 hour test period at a pressure equal to 125% or more of MOP, the test pressure may be reduced to a pressure of 110% or more of MOP for the additional 4 hours of testing (leak test).

**Test Medium Identified** — if not shown on the test record, the test medium should be assumed to be water and 'Yes' should be checked.

**Description of Facility Tested**

- **Mainline Tests** — if test boundaries are not identified for pipelines containing scraper traps, it shall be assumed the mainline test ended at the bypass valve and mainline block valve of the scraper trap (inclusive).
- **Station Test** — if the description of the piping tested is not clearly understood by wording, drawings, and/or sketches, the record shall be noted on the review form as incomplete.

Explanation of Pressure Discontinuities — if the pressure discontinuities on the chart can be analyzed and attributed to weather conditions, then the notation of weather condition shall be considered as evidence of ‘explanation.’

**Profile of Test Section**

- For hydrostatic tests conducted after 1/8/1971 per DOT 49 CFR 195, a profile of the test section shall be completed and attached to the record if the elevation difference in the test section exceeds 100 feet.
- If the elevations are not included in the test record, then the elevations of the dead weight tester, high point and low point of the test section shall be obtained from the profile.

Test Record Documentation Complete Identify whether the test record documentation is 100% complete.

The “Pipe Information” section summarizes pipe data information for all new construction, modifications, and stock pipe.

The “Data for Determining MOP” section summarizes the limiting components in the test section and shows the calculation for determining the MOP of the pipe.

**RECORDS MANAGEMENT**

The Hydrostatic Test Drawings and Documentation Requirements

shows the drawings and documents that shall be updated following the completion of a hydrostatic test.

**TRAINING**

Purpose — To provide with a standardized process for designing and planning, executing, reviewing and documenting hydrostatic tests in accordance with Tesoro Logistics LP. (TLLP) “Integrity Management Program,” the Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP), and API 1160 — “Managing System Integrity for Hazardous Liquid Pipelines.”

Learning Objectives — understand this Standard as it relates to the job function in accordance with Tesoro Logistics LP. (TLLP) “Integrity Management Program,” the Department of Transportation (DOT) 49 CFR 195.452, Integrity Management Program (IMP), and API 1160 — “Managing System Integrity for Hazardous Liquid Pipelines.”

**Related Training**

Tesoro Logistics LP. (TLLP) “Integrity Management Program”

Tesoro Logistics LP. (TLLP) Standard for “Pipeline Repairs.”

Tesoro Logistics LP. (TLLP) Lock-Out / Tag-Out (LO/TO) Plan and Procedures.

Tesoro Logistics LP. (TLLP) Operator Qualification Plan.

**References**

Part 192, Title 49 CFR – “Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards,” Revised as of October 1, 2002

Part 195, Title 49 CFR - "Transportation of Hazardous Liquids by Pipeline: Minimum Federal Safety Standards", Revised as of October 1, 2002

ANSI B31.4, "Liquid Petroleum Transportation Piping", 1998 Edition, .

ANSI B31.8, "Gas Transmission and Distribution Piping Systems," 1995 Edition

API 1110, "Pressure Testing of Liquid Petroleum Pipelines," 4th Edition

API 1160, "Managing System Integrity for Hazardous Liquid Pipelines," 1st Edition

## **SECTION 1 E**

### **SPECIAL CONDITIONS**

#### **HYDROSTATIC TEST PRESSURES**

The CONTRACTOR shall perform a hydrostatic test on the pipeline, which stresses the pipe at the low point of the section being tested to a minimum of 1000 psi.

#### **CONTRACTOR STAGING AREA**

CONTRACTOR must furnish a staging yard for work force to assemble and depart daily. No private (no-CONTRACTOR) vehicles will be allowed in the vicinity of work. The intent is to minimize traffic in the work area.