



Integrity Testing Requirements for Hazardous Liquid Pipelines in California

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
OFFICE OF THE STATE FIRE MARSHAL
PIPELINE SAFETY DIVISION



Revised - May 2023

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Introduction

The Office of the State Fire Marshal (OSFM) has developed this manual to assist hydrostatic testing firm personnel and pipeline operators in understanding the requirements of the integrity testing provisions of Chapter 5.5 of the California Government Code and Code of Federal Regulations (CFR) Part 195.

Comments, questions, or recommendations concerning this document are welcome and encouraged. Please send your comments to:



CAL FIRE/Office of the State Fire Marshal
Pipeline Safety Division
3780 Kilroy Airport Way
Suite #500
Long Beach, CA 90806
Phone # (562) 497-0350
Email : pipelinenotification@fire.ca.gov

History of the OSFM Integrity Testing Program

California is home to more than 5600 miles of hazardous liquid pipelines that transport crude oil, refined products (gasoline, diesel, jet fuel) and highly volatile liquids around the state from production facilities to refineries and ultimately to market. These pipelines operate at high pressures. Should they fail, they would pose a threat to the residents of California, property, and the environment. To prevent accidents and spills, state and federal regulations require pipeline operators to conduct hydrostatic pressure tests to ensure the integrity of their pipelines.



A pressure test involves pressurizing a pipeline with a test medium (usually water) to a pressure more than its Maximum Operating Pressure (MOP). The pipeline successfully passes the hydrostatic pressure test if it can withstand that pressure for a set period of time (usually 8 hours). Typically, there are three types of pressure test: Strength Test, Leak Test and Spike Test.

In the late 1970's and early 80's, the City of Long Beach, and the County of Los Angeles both required hydrostatic pressure testing of pipelines as dictated in their pipeline franchise agreements with the pipeline operators. One required a 4-hour test, while the other an 8-hour test.

This caused scheduling problems for operators who had pipelines crossing several city and county jurisdictions as the testing intervals varied depending on local ordinances.

The California Pipeline Safety Act of 1981 (CAPSA) gave the OSFM exclusive safety authority over the intrastate hazardous liquid pipelines, except onshore rural gathering pipelines, establishing uniform pressure testing requirements statewide.

Beginning in 1984, all intrastate pipelines were required to be pressure tested at least once every 5 years. Prior to this date, pipelines were tested only at the time of construction. This new law was a big step forward in progressing pipeline integrity assessments. As a result, the frequency and severity of pipeline leaks dropped significantly.

In the early 2000's, the United States Department of Transportation (USDOT), Pipeline and Hazardous Materials Safety Administration (PHMSA) enacted similar federal integrity management rules. However, California's pipelines had already gone through 4-5 testing cycles, ensuring our place as a national leader in responsible and safe transportation of hazardous liquids such as crude oil and refined products.



Photo 1 – Division Chief Bob Gorham onsite for a pipeline’s Hydrostatic Test

- The program started with the passage of the Elder Pipeline Safety Act of 1981
- Operators are required to pressure test each Hazardous Liquid Pipeline at least once every 5 years, once every two years for high risk, and once per year for buried pipelines without cathodic protection (CP).
- Tests must be certified by an OSFM approved Independent Testing Firm. Please refer to the OSFM Certified Testing Firm List.
- Test results must be documented and sent to OSFM for review by the Independent Testing Firm
- Operators may request to use In-Line Inspection (ILI) tools in lieu of Hydrostatic Pressure Testing using the OSFM waiver request process.
- Testing and Repairs may be monitored onsite by the OSFM



Section I - OSFM Integrity Testing Categories

There are several circumstances in which pressure tests are required by the Office of the State Fire Marshal. These circumstances may determine certain requirements such as the duration of the test and the test pressure.

- New Construction, Relocated, or Repaired Pipe
- Components or Valves
- Pre-tested Pipe
- Integrity Assessment for IMP
- California Required Pressure Test
- Facility Piping
- Breakout Tanks
- Conversion to Service

New Construction, Relocated, or Repaired Pipe

Pressure tests are required to determine the integrity of a newly constructed pipeline immediately after construction or before placing a relocated, repaired or replacement pipeline in service as required by 49 CFR §195.302 and CA Govt. Code Section 51013.5. The post-construction pressure test verifies the adequacy of the pipeline materials and construction methods and ensures that it is structurally sound to operate at a designed Maximum Operating Pressure (MOP).

Components/Valves

Each pressure test must include all pipe and attached fittings, including components. Components do not need to be tested if it is the only item being replaced or added to the pipeline system (i.e., no pipe is added or replaced) as long as the manufacturer certifies that either: (1) The component was tested at factory or (2) the component was manufactured under quality control system to a prototype (49 CFR Part 195.305).

CA Govt. Code Sec. 51013.5

Every new pipeline, existing pipeline or part of a pipeline system that has been replaced or relocated, must be tested according to Subpart E.

49 CFR Part 195.302

No operator may operate a pipeline unless it has been pressure tested under this subpart without leakage. In addition, no operator may return to service a segment of pipeline that has been replaced, relocated, or otherwise changed until it has been pressure tested under this subpart without leakage.

49 CFR Part 195.308

Pipe associated with tie-ins must be pressure tested, either with the section to be tied in or separately.



Each valve must be both hydrostatically shell tested and seat tested without leakage to at least the requirements set forth in Section 11 of American Petroleum Institute (API) Standard 6D (incorporated by reference, see §195.3).

Hydrostatic testing through a valve does not count as a shell test as required by §195.116 (d).

Pre-Tested Pipe

Pre-tested pipe is piping which has been hydrostatically tested for a minimum of 4 hours prior to installation. Hydrostatic testing of pre-tested pipe shall be certified by an approved representative of a certified independent hydrostatic testing company.

If you plan on using pre-tested pipe and the required hydrotest information is not visibly marked on the outside of the pipe (every 5-feet),

the pre-test certification is void and the pipe shall be re-tested (unless you plan on hydrotesting the whole line). The pre-test certification shall be marked (stenciled) on the outside of the pre-tested pipe at intervals of approximately five feet: OSFM Test ID No., Date of Test, and Test Pressure.

U.S. DOT Integrity Management Program

Beginning in 2001, USDOT/PHMSA required all pipeline operators to comply with the Liquid Integrity Management (IM) Rule. The Liquid IM Rule specifies how pipeline operators must identify, prioritize, assess, evaluate, repair, and validate the integrity of hazardous liquid pipelines that could, in the event of a leak or failure, affect High Consequence Areas (HCAs) within the United States. HCAs include population areas, areas containing drinking water and ecological resources that are unusually sensitive to environmental damage, and commercially navigable waterways.

Frequency of IM evaluation is determined by an operator and shall not exceed 5 years without OSFM approval. Frequency of evaluation is based on risk factors specific to a pipeline that include but are not limited to:



- Analysis of results from previous integrity assessments. (e.g., anomaly detection, corrosion growth rate, and crack growth rate)
- Leak history and repair, cathodic protection surveys and history
- Product transported
- Operating stress level
- Local environmental factors (e.g., soil corrosivity, climate)
- Pipe diameter and thickness, age of the pipe, material and manufacturing information, coating type/condition, and seam type

Operators must use these, and any other applicable conditions, to determine the required pipeline IM assessment interval. Operators should not default to the regulatory minimum interval of 5 years once the baseline assessment is completed. Depending on the corrosion growth rate and/or crack growth rate, the integrity assessment frequency could be more frequent than 5 years. It is the responsibility of an operator to perform an engineering analysis and, based on the characteristics of the flaw and growth rate, to determine the appropriate frequency of the integrity assessment.

California Integrity Assessment Interval Requirements

California Government Code Section 51013.5 requires that all regulated intrastate pipelines must be hydrostatically tested according to the following:

1. Every pipeline not provided with properly sized automatic pressure relief devices or properly designed pressure limiting devices shall be hydrostatically tested **annually**. (51013.5 (b))
2. Pipelines over 10 years of age and **not provided with effective cathodic protection** shall be tested every **3 years**, except for those on the State Fire Marshal's list of higher risk pipelines which shall be hydrostatically tested **annually**. (51013.5 (c))
3. Pipelines over 10 years of age and **provided with effective cathodic protection** shall be hydrostatically tested every **5 years**, except for those on the State Fire Marshal's list of higher risk pipelines which shall be hydrostatically tested every **2 years**. (51013.5 (d))
4. Pipelines within a refined products bulk loading facility served by pipeline shall be tested every **5 years** for those pipelines **with effective cathodic protection** and



every **3 years** for those pipelines **without effective cathodic protection**. If that piping is observable, visual inspection may be the method of testing. (51013.5 (e))

***Note: This hydrotest requirement is for all pipelines that are regulated under CAPSA, regardless of whether a section of the pipeline could affect a High Consequence Area (HCA).**

Please see Appendix F – California Higher Risk Pipelines for more information on the State Fire Marshal’s list of Higher Risk Pipelines, to include a detailed description on the criteria that must be met to be placed on this list.

Although the maximum integrity assessment interval is 5 years for pipelines that are under **CAPSA’s regulation**, the integrity assessment could be **more frequent** if the Operator’s engineering analysis concludes that a shorter integrity assessment interval is necessary. This should be considered when using the integrity assessment to satisfy both the CAPSA and Integrity Management Program Requirements.

Note: If a conflict occurs between Federal and State laws and regulations, the more stringent one will apply.

In-Plant Piping

In-plant piping systems means piping that is located within the boundaries of an operator’s plant and used to transfer hazardous liquid or carbon dioxide between plant facilities and a pipeline or other mode of transportation, not including any device and associated piping that are necessary to control pressure in the pipeline under §195.406(b).

This piping is jurisdictional to the Office of the State Fire Marshal and PHMSA but, not regulated.

Facility Piping

Jurisdictional piping/components within a breakout tank or bulk loading facility must be tested according to Subpart E of 49 CFR Part 195 prior to being commissioned (entering service). This requirement is referenced in CAPSA 51013.5 (e).

Periodic testing of regulated piping within a “facility” is not generally required unless specified in the Pipeline Operator’s Integrity Management Program Assessment Plan. Operators may use “Other Technologies” such as Guided Wave Ultrasonic Testing (GWUT) to inspect their **facility** piping without prior approval from OSFM or PHMSA.

Breakout Tanks

Breakout Tanks must be tested in accordance with 49 CFR Part 195.307 which references the following industry standards or specifications:

API Specification 12F – Specification for Shop Welded Tanks for Storage of Production Liquids

API Standard 620 – Design and Construction of Large, Welded, Low-pressure Storage Tanks

API Standard 650 – Welded Steel Tanks for Oil Storage

API Standard 653 – Tank Inspection, Repair, Alteration, and Reconstruction

API Standard 2510 – Design and Construction of LPG Installations

Please see CFR Part 195.3 to ensure the appropriate edition of the industry standard that is incorporated by reference is utilized. **Note: The most recent version of an industry standard may not be the version that is incorporated by reference in CFR Part 195.**



Section II - OSFM Integrity Testing Notifications and Waivers

Integrity Test Notifications

The Office of the State Fire Marshal tracks each pressure test and in-line inspection conducted on intrastate hazardous liquid pipelines regulated by California law, **except onshore rural gathering pipelines since they are not covered under CAPSA (California Pipeline Safety Act)**. CAPSA Section 51014.3 requires Pipeline Operators to notify OSFM prior to conducting an integrity test. A unique test ID number is then generated for each integrity test, which must be included with the results submission for that test.

CA Govt. Code Sec. 51014.3
 The Pipeline Operator shall notify SFM and local Fire Department at least three days prior to conducting the hydrostatic pressure test.

Notify OSFM of Hydrostatic Pressure Test

It is the responsibility of the pipeline operator to notify the OSFM Pipeline Safety Division at least 3 working days prior to conducting a pressure test. The Operator may download the Notification of Proposed Hydrostatic Test or Notification of Proposed In-Line Inspection form from the OSFM website: <https://osfm.fire.ca.gov/divisions/pipeline-safety-and-cupa/hydrostatic-testing/>

Appendix B - Hydrostatic Test Notification Form HYD-1

OFFICE OF THE STATE FIRE MARSHAL
 PIPELINE SAFETY DIVISION
 3780 King Airport Hwy, Suite 500
 Long Beach, CA 90806

NOTIFICATION OF HYDROSTATIC TEST
 Operator must Email request to: PipelineNotification@fire.ca.gov

Operator Name:	
Operator ID:	
OSFM Line ID:	If the test includes multiple OSFM lines, a separate notification must be submitted for each individual OSFM Line ID
High Risk:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Company Performing Hydrotest:	
Person Requesting (Operator):	
Title:	
Address:	
City:	
State:	
Zip Code:	
Phone:	
Email:	
Test Date:	<input type="checkbox"/> 4 Hours <input type="checkbox"/> 8 Hours
Test Duration:	<input type="checkbox"/> OSFM High Risk <input type="checkbox"/> MP (Part 195.452) <input type="checkbox"/> New Construction <input type="checkbox"/> Relocation
Type of Test:	<input type="checkbox"/> 1 year <input type="checkbox"/> 2 year <input type="checkbox"/> 3 year <input type="checkbox"/> 5 year <input type="checkbox"/> 10 year <input type="checkbox"/> Facility Includes Valves, Receivers, In-plant Piping
Test Medium:	<input type="checkbox"/> Water <input type="checkbox"/> Other (OSFM Waiver Required, please attach justification)
If Other List Test Medium:	
Length of Pipe Tested (feet):	
Proposed Test Pressure (psig):	
MCP of Pipeline (psig):	
Test Equipment Location:	
Comments:	

The State Fire Marshal and the local fire department must be notified by the Operator at least 3 working days prior to the Hydrostatic Test for pipeline tests in public areas.

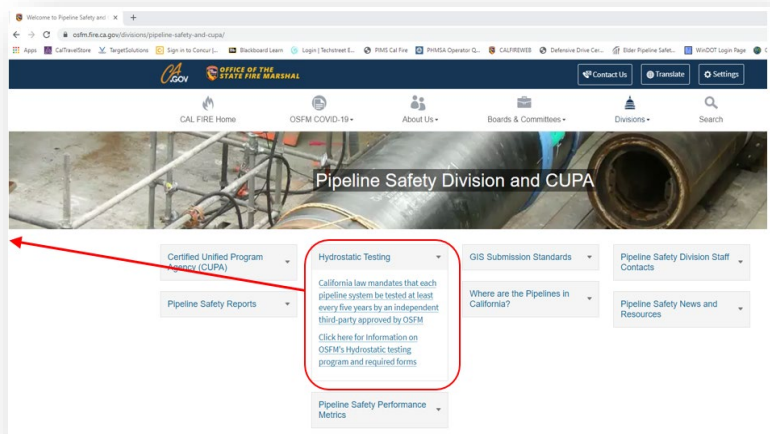
Please include a one-page PDF map of the proposed line that will be tested with this submission.

For Official Use, Only:

OSFM Test ID:	Notification Date:	Notification Received By:
Waiver Request Received Date:	Waiver Request Granted? <input type="checkbox"/> Yes <input type="checkbox"/> No	Waiver Approval Letter Sent Date:

If the Test Medium is NOT Water, a Waiver is Required.

Rev. 09/2019



Please follow the instructions on the OSFM Forms.
Email notifications to pipelinenotification@fire.ca.gov.

Emergency Notification of a Test

In an emergency, a notification period of less than three working days may be allowed if approved in advance by OSFM. An emergency hydrostatic pressure test request notification can be emailed and called into the OSFM Pipeline Safety Division Long Beach Office at (562) 497-0350.



The notification requirement is satisfied only for the date the test is first scheduled. If the testing process is postponed or delayed to a later date, the operator must notify the OSFM and local fire department of the **new test date(s)**.

Hydrostatic test notification (Form HYD-1) shall include but is not limited to the following (CAPSA 51014.3):

- Operator name, address, and telephone number
- Location of pipeline to be tested, and location of test equipment
- Date and time of test
- Test medium
 - Name, telephone number and the address of independent testing firm or person responsible for certifying test results

Integrity Test Waivers

Pipeline Operators may request the following integrity testing waivers or actions:

- **Request to use an In-Line Inspection (ILI) or an alternative method in lieu of hydrostatic pressure test. (Form ILI-1)**
- Request to move testing date e.g., Test starting 1 day later than what was submitted on the Hydrotest or ILI Notification.
- Request to use liquid petroleum having a flashpoint over 140 degrees Fahrenheit as a test medium for a pressure test.



Request to Use an Internal Inspection Tool

In-line inspection (ILI) tools have advantages and disadvantages when it comes to measuring pipe for defects that could affect integrity. When selecting the tool most

suitable for integrity testing, pipeline operators must consider the diameter, wall thickness, and material of the pipe being measured; the types of defects that the pipe might be subject to (e.g., internal corrosion, external corrosion, dents with metal loss, weld cracks, stress corrosion cracks, corrosion of or along the long seam); and any additional risks to the pipe section being tested. Based on the risks to the pipeline, the Operator should select and run the most appropriate tools to evaluate those risks.

California Government Code Section 51013.5(i) allows the OSFM to approve integrity assessments using an instrumented internal inspection device for all intrastate pipelines except onshore rural gathering pipelines. **Unlike CFR 49 Part 195.452, CAPSA requires the entire pipeline to be inspected, not just the section that could affect an HCA.** Operators may request to use an ILI tool or an alternative method in lieu of hydrostatic pressure test.

The Pipeline Operator is required to notify the OSFM Pipeline Safety Division Office in Long Beach at least three days prior to the launching of the ILI tool. Operators must use OSFM form “*Notification of Proposed In-Line Inspection In Lieu of Hydrostatic Test, (Form ILI-1)*” to notify OSFM. The form can be found at the following website: <https://osfm.fire.ca.gov/divisions/pipeline-safety-and-cupa/hydrostatic-testing/>.

OSFM staff may be present to observe the testing of that pipeline at any time throughout the testing phase.

Note: The ILI notification form also requires a one-page map of the pipeline segment that will be tested.

The OSFM will review the ILI request and provide a written response to the pipeline operator. If approved, a unique Test ID number will be generated for each integrity test.

A copy of the vendor ILI inspection summary must be provided to the State Fire Marshal for review within 3 days of declaring discovery after receiving the Final ILI Report. This inspection summary shall include but is not limited to:

- The total footage from launcher to receiver
- The count of immediate, 60-day, and 180-day anomalies discovered
- The proposed method and general repair schedule to investigate and remediate these anomalies.

OSFM may direct the Operator to conduct additional testing if our engineering staff, after reviewing inspection summaries, determines that the test method used does not adequately evaluate the integrity of the pipeline.

Any anomaly identified which can be classified as a Safety Related Condition under provisions of 49 CFR Part 195.55 must be documented and submitted to PHMSA as a Safety Related Condition Report. Copies of the Safety Related Condition report and repair plan shall be emailed to OSFM for review at pipelinenotification@fire.ca.gov.

Anomalies determined to be an Immediate Repair condition under 49 CFR Part 195.452 shall be promptly reported and shall be repaired as soon as possible, unless the pipeline is shutdown, or a pressure reduction has been imposed.

Note that CFR Part 195.452(n) will require all pipelines that could affect an HCA be modified to accommodate the passage of an instrumented internal inspection device by **July 2, 2040**.

As a final note, the State Fire Marshal may require any pipeline subject to this chapter to be subjected to a pressure test, or any other test or inspection, at any time, in the interest of public safety. (CAPSA, 51013.5 (h))

Request to Extend Integrity Testing Date

California Government Code Section 51013.5 requires each intrastate hazardous liquid pipeline in California (except for onshore rural gathering pipelines) over 10 years of age to be hydrostatically tested at the specified frequency described previously in this manual. (See **California Integrity Assessment Interval Requirements**)

In coordination with the Federal Integrity Management Rule, a Pipeline Operator must establish up to five-year intervals, not to exceed 68 months, for continually assessing their line pipe's integrity. An operator must base the assessment intervals on the risk the line pipe poses to the high consequence area to determine the proper time interval for assessing the pipeline segments.

If the Pipeline Operator is unable to meet the required integrity assessment time interval, they must notify the OSFM 90 days prior to the test due date for evaluation of a time extension. An operator may exceed the integrity assessment time interval by 8 months not to exceed a total of 68 months. The 8-month extension is **ONLY** for **UNFORESEEABLE** events that occurred which impede the operator's ability to complete an integrity assessment within the required time interval. This mirrors PHMSA's Liquid Integrity Management Rule FAQ, Question 5.11.

If an extension is granted, the next integrity assessment date will be up to 5 years from the last successful integrity assessment completed.

Example:

1. Integrity Assessment due date – January 2020
2. Integrity Assessment Extension granted for up to 8 months due to unforeseeable events and approved by OSFM

3. Integrity Assessment completed May 2020 (Operator did not use the entire 8-month extension)
4. Next Integrity Assessment due date – May 2025

Request to extend the testing date **not to exceed 8 months** past the 5-year interval:

Operator must officially correspond in writing to include appropriate justification with OSFM to request for an up to 8 month time extension not to exceed 5 years and 8 months in total to complete an assessment. **This request should be submitted BEFORE the 5-year timeframe elapses and will be evaluated and validated by OSFM for reasonableness. An “extension of time” waiver request will require the approval of an OSFM Pipeline Safety Chief.**

Request to extend the testing date **beyond 8 months** past the 5-year interval:

This is related to the Federal requirement, 49 CFR Part 195.452 (j)(4)(i) and (j)(4)(ii)

Variance based on an “engineering” evaluation – request must be submitted to PHMSA 270 days prior to the end of 5-year (or less) interval.

Variance based on an “unavailable technology” – request must be submitted to PHMSA 180 days prior to the end of 5-year (or less) interval.

Request to Use Liquid Petroleum as a Test Medium for Pressure Testing

The State Fire Marshal may issue a waiver for the use of liquid petroleum having a flashpoint over 140 degrees Fahrenheit (60 degrees Celsius). Except for offshore pipelines, liquid petroleum that does not vaporize rapidly may be used as the test medium if the requirements listed in CFR Part 195.306(b) are met.

A pipeline operator must, at a minimum, include the following information with the request to use liquid petroleum as a test medium (this is in addition to the form HYD-1):

1. Identify and explain the need to use a product other than water
2. Test pressure as a % of SYMS
3. Proposed product to be used as the test medium for the pressure test
4. API or specific gravity and flashpoint of the proposed test medium

5. Safety Data Sheet (SDS) product flash point verification
6. Pressure test procedures addressing the following:
 - a. Effective communication throughout the entire pipeline route
 - b. Adequate personnel stationed at sensitive areas
 - c. Site specific procedures to follow in the event of a leak and for all phases of testing
 - d. Notification of local fire departments
 - e. Emergency manuals onsite and easily accessible in the event of an incident
 - f. Appropriate PPE (Personal Protective Equipment) for every individual involved in the test and every individual that could be impacted by the test.
7. Verification that the entire pipeline section under test is outside of cities and other populated areas
8. Verification that each building within 300 feet of the test will be unoccupied while the test pressure is equal to or greater than a pressure which produces a hoop stress of 50 percent of specified minimum yield strength
9. OSFM Line I.D. Number and Pipeline description

Each request will be reviewed on an individual basis and the operator will receive a written response from the OSFM. **Note: Granting a State Waiver for liquid petroleum as a test medium will require concurrence from PHMSA.**

PHMSA is authorized under Section 60118 (d) of the Pipeline Safety Act to review all state waivers of federal pipeline safety regulations. PHMSA may file written objections with the state before the effective date of a waiver. The federal statute requires states to give PHMSA written notice at least **60 business days** (in addition, PHMSA has requested states to add 5 more business days into this process) before the written notice is to be transmitted by registered or certified mail to the Associate Administrator of PHMSA for Pipeline Safety.

Therefore, requests should be submitted **90 days** prior to testing to provide adequate response time. The OSFM will review the application, conduct a pre-test site assessment, submit recommendation to PHMSA, and provide a written response to the pipeline operator. OSFM staff will observe the testing when possible.

Waiver Requests Sent to OSFM

The Pipeline Operator must submit their written waiver request to:

CAL FIRE – Office of the State Fire Marshal
Pipeline Safety Division
3780 Kilroy Airport Way
Suite #500
Long Beach, CA 90806



Section III - OSFM Pressure Testing Requirements

General Testing Requirements

- Test Medium
- Test Pressure
- Pressure measurement
- Temperature measurement
- Monitoring and Hourly Changes
- Dead Leg Piping and Proper Isolation of Test Segments
- Approved Independent Testing Firms
- Operator Qualification Requirements
- Documenting Test Results for Submission to OSFM
- Other Requirements



Note: State Fire Marshal shall not supervise, control or direct integrity assessments or testing

Approved Independent Testing Firms

California Government Code Section 51014.5 requires that all pressure test results submitted to the OSFM be certified by an independent testing firm or person approved by the State Fire Marshal. **OSFM does not certify pressure testing companies. We approve Pressure Testing Firms or Persons who then certify the results of pressure tests.** At the start of each fiscal year, July 1st, the State Fire Marshal publishes a list of companies and persons who are **approved** to certify pressure tests for that fiscal year.

Independent Testing Firm Approval Process

Companies wishing to certify Pressure Test Results for pipelines regulated by OSFM must submit an Initial Application to the State Fire Marshal. The Initial Application form is available on OSFM website: <https://osfm.fire.ca.gov/divisions/pipeline-safety-and-cupa/hydrostatic-testing/>.

All sections of the application form must be completed. Entries must be in ink or typed. OSFM will examine the completed application and evaluate the qualifications, experience and training of the applicant's employees conducting the pressure test. An on-site evaluation will be conducted by OSFM during the applicant's pressure test before that applicant is approved and added to the State Fire Marshal's List. An on-site evaluation may be conducted on the applicant's business location to determine if adequate calibrated equipment is available for use during pressure testing.

The applicant will be notified in writing of the approval or denial of the application. Approved applicants and their staff will be included on the State Fire Marshal's annual list of Approved Testing Firms. Each approved test firm must pay the Approved Independent Testing Firm fee of \$1,500 each fiscal year.

Renewal of Annual Pressure Testing Firms

Each year, an Approved Independent Testing Firm must submit an application for renewal of their approved status to the State Fire Marshal. The State Fire Marshal will send each approved Testing Firm an invoice and renewal form in May. Application and fees must be received prior to the beginning of the fiscal year (July 1st).

The State Fire Marshal only approves independent testing firms or persons. **The State Fire Marshal does not certify individuals.**

Operator Qualification Requirements

PHMSA requires pipeline operators to develop a written qualification program to evaluate the ability of employees and their contractors to perform "covered tasks" and to recognize and respond to abnormal operating conditions that may be encountered while performing these activities.

The State Fire Marshal does not certify individuals to be "Operator Qualified" with respect to Hydrostatic Testing Tasks.

Dead Leg Piping

All dead legs must be located prior to pressure testing. For testing purposes, the dead legs need to have pressure gauges and bleeder valves installed on them prior to testing. This is to ensure that all air has been removed from the dead leg and that the dead leg has been pressurized for the test.

Test Medium

Water is typically used as test medium unless a waiver has been granted.

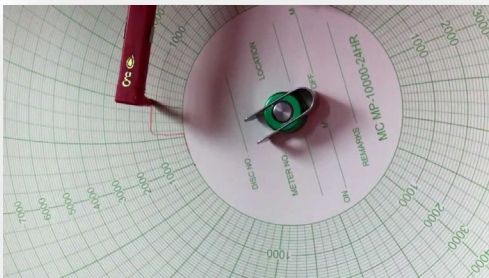
Exceptions: Liquid petroleum that does not vaporize rapidly may be used if approved by the State Fire Marshal (waiver required).

Liquid Petroleum may be used if:

- Flashpoint is over 140 degrees Fahrenheit
- Operator receives OSFM approval **prior to** conducting the test.
- Verify the entire line is outside cities and other populated areas
- Verify each building within 300' is unoccupied
- Test section is kept under surveillance
- Continuous communication is maintained throughout the testing process
- Pressure test procedures must address:
 - Effective communication along the entire pipeline route
 - Adequate personnel stationed at sensitive areas
 - Site specific procedures to follow in the event of a leak and for all phases of testing
 - Notification of local fire departments
 - Emergency manuals onsite and easily accessible in the event of an accident/incident
 - Appropriate PPE (Personal Protective Equipment) for every individual involved in the test and every individual that could be impacted by the test.
- Refer to Section II – Request to Use Liquid Petroleum as a Test Medium for more information.



Test Pressure



Every pipeline must be pressure tested to a minimum of 125% of the maximum operating pressure for 4 continuous hours. This includes pipeline within a bulk loading facility.

If the line cannot be visually inspected, the pipeline must be tested for **an additional** 4 hours at pressure equal to 110% or more of the maximum operating pressure.

When a spike test is conducted to assess the integrity of pipelines susceptible to long seam failure, the spike test pressure should be at least 1.39 of MOP for a minimum of 15 minutes.

Pre-tested pipe must be pressure tested to a minimum of 125% of the maximum operating pressure for 4 continuous hours.

Refer to the Operator's Integrity Management Plan because it may be more stringent and require an 8-hour hydrostatic pressure test. This would only apply to the sections of the pipe that affect or could affect an HCA. It is common practice to hydrotest for 8 hours.

Test Measurement Requirements

- Deadweight tester capable of measuring to 1 psi increments and calibrated within two years of test date.
- Pressure gauges shall be provided at a minimum, each end of the test segment to indicate the entire test segment is pressurized to the required test pressure. Gauges should be calibrated prior to testing and have written certification of calibration.
- Pressure gauges should be attached at each location the pipeline comes above ground.
- Temperature gauges should be attached directly to the pipeline at a minimum of two locations to measure the average temperature of the test medium. Ambient air temperature shall also be recorded.
- Pressure and temperature readings should be continuously monitored throughout the test and recorded at a maximum 30-minute interval
- Pressure chart recorder for continuous pressure recording shall be used (calibrated prior to test)
- Temperature chart recorder for continuous temperature recording shall be used (calibrated prior to test)
- Calibration documents must be made available at the testing site upon request for the equipment used.



Temperature Measurement

The measuring device shall be placed to ensure an accurate pipe wall temperature is maintained to prevent dynamic variables on pipelines (pothole and bury).

Do not use a Thermal Coupling Temperature Probe as your ambient temperature probe.

Do not spray water on temperature test probe (water will change the probe temperature).



Hourly Change

All changes in test medium volume (water) must be measured and accounted for by the Operator. The Operator must prove there are no leaks on their pipeline. The common methods for proving there are no leaks are:

1. Visual Inspection (exposed pipe only)
2. Engineering analysis – to include references for pressure, medium temperature, water added, water removed, ambient temperature

Hourly Change: Amount of fluid that cannot be accounted for by direct measurement or through temperature/pressure/volume change calculations.

Hydrostatic Pressure Test Leaks

Any failures occurring after the test begins are considered a leak and must be documented and reported immediately.

All leaks occurring on the pipeline as a result of the pressure testing process must be reported to OSFM on the Hydrostatic Test Results Reporting Form – Form HYD 3. Information submitted shall include the location and cause of the failure.



Except for failures of pre-tested pipe, any leak on a pipeline undergoing a pressure test shall immediately be reported to the fire department jurisdictional to the leak location and to the California Emergency Management Agency (Cal-OES). The 24-hour emergency telephone number for California Office of Emergency Services (Cal-OES) is 1-(800) 852-7550. It is considered an industry best practice to indicate to Cal-OES personnel that this failure notification is **required by the Office of the State Fire Marshal**.

If the pressure test process has stopped for an extended length of time it will be considered a failed test, the Operator needs to call the OSFM and provide us with a new test start date. The test ID associated with the failed pressure test should be considered retired and used

only as a reference to document that a test failed. Once an appropriate repair has been made, contact OSFM through the normal process and request for a **NEW** Hydrotest ID to accompany your presumably successful attempt. Please reference the failed test and test ID in your successful test report which has a section for reporting test failures as depicted below.

LIST ALL LEAKS ON LINE PIPE RESULTING FROM UNSUCCESSFUL TEST ATTEMPTS	
LOCATION	CAUSE
Approved Hydrostatic Testing Firm	

Section IV - OSFM Integrity Testing Reporting

Reporting Requirements

- Pressure Testing Reporting
- In-line Inspection Reporting



Pressure Testing Reporting

Results of pressure tests required by CAPSA Section 51013.5 shall be submitted by the independent testing firm or person within 30 days after completion of the test to the State Fire Marshal, who may review the results.

The submitted report shall include any information needed to interpret test results but, at a minimum, will include the following information:

1. OSFM Test ID for tracking the test. (Issued by OSFM)
2. Name of operator, name of person responsible for conducting the test and name of Independent Testing Firm used
3. The date and time of the test
4. A description of the pipeline tested including a map of suitable scale showing the route of the pipeline and pipeline section tested
5. The results of the test which should include the incremental pressure readings and the amount of water that was added or removed during the test.
6. Minimum test pressure held/sustained throughout the test.
7. The test medium
8. Pressure recording chart(s)
9. Temperature recording chart(s)
10. Test instrument calibration data
11. Explanation of any pressure discontinuities, test failures, rapid depressurizations etc.
- 12. Profile of the pipeline where elevation differences exceed 100'**
13. Any other test information that may be specifically requested by the State Fire Marshal

A *Hydrostatic Test Results Reporting Form HYD-3* may be downloaded from the OSFM website:

<https://osfm.fire.ca.gov/divisions/pipeline-safety-and-cupa/hydrostatic-testing/>

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 PIPELINE SAFETY DIVISION
 3780 Kilroy Airport Way, Suite 500
 Long Beach, CA 90806

Appendix D – Test Results Form HYD-3
 Revision Date: 04/2020

HYDROSTATIC TEST RESULTS/PIPELINE DATA

Test Date: _____ OSFM Test ID #: _____

Pipeline Operator: _____ Independent Testing Firm: _____

Type of Test and Pipeline Identification (description, line number, name, pre-tested pipe, etc.)
 1 Year 2 Year 3 Year 5 Year IMP (Part 195.452) OSFM High Risk Pre-tested pipe
 New Construction Relocation Facility (includes: Valves, Receivers, In-plant Piping)

Comment: _____

Pipeline Location (mile post, street, station, etc.)
 From: _____ To: _____

CSFM Line ID#: _____

Product Normally Transported: _____

Test Medium: Water Other (Specify) _____

Location of Deadweight Tester: _____ Deadweight Elevation (ft): _____

Elevation of Pipeline High Point (ft): _____ Low Point (ft): _____

Test Pressure High Point (psig): _____ Low Point (psig): _____

Maximum Operating Pressure (psig): _____

PIPE DATA

Pipe O.D. (in.)	Wall Thickness (in.)	Specification & Grade (SMYS)	Length of test segment (ft)	Volume (Barrels)

TEST EQUIPMENT

Make of Deadweight Tester	Serial #	Date Last Calibrated

Make of Pressure Chart Recorder (1) / Gauge (2)	Serial #	Date Last Calibrated
1) Recorder: _____		
2) Gauge: _____		

Make of Temperature Recorder (1) / Gauge (2)	Serial #	Date Last Calibrated
1) Recorder: _____		
2) Gauge: _____		

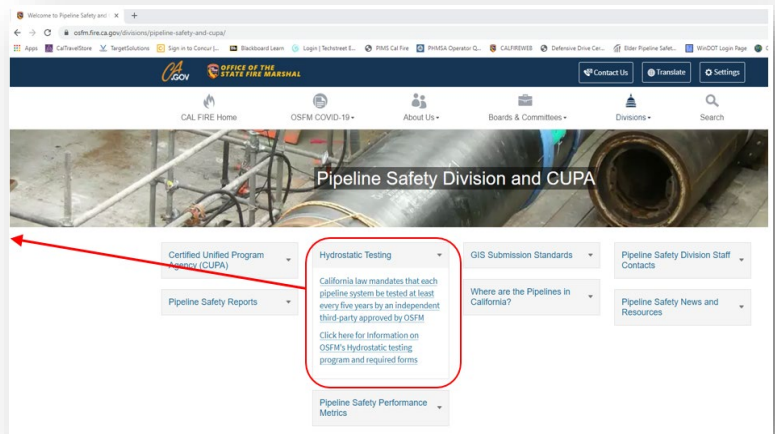
GPS Beginning Location: _____ Ending Location: _____

Latitude: _____

Longitude: _____

*N/A is not acceptable in these fields.

Page 1 of 3



In-Line Inspection Tool Summary Reporting

The Pipeline Operator must submit a copy of the internal inspection summary to the OSFM for review. The ILI summary shall include at a minimum the following information:

- 1) OSFM Test ID for tracking the test (Issued by OSFM)
- 2) **All required information by the ILI Waiver the Operator received from OSFM (There are 6 conditions to be met in the ILI Waiver)**
- 3) Date of the test
- 4) Description of the pipeline tested
- 5) Total pipeline footage from the launcher to the receiver

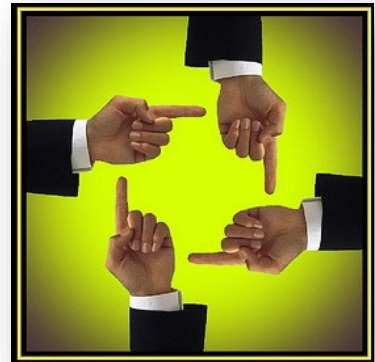
- 6) The number of Immediate, 60-day, and 180-day anomalies discovered, the location of these anomalies, and the method of repair. A general repair schedule on when these identified anomalies will be repaired.
- 7) Any anomaly identified which can be classified as a Safety Related Condition or an Immediate Repair Condition shall be promptly reported and shall be repaired as soon as possible.
- 8) Any information needed by the Office of the State Fire Marshal to adequately interpret test results

*All paperwork that is submitted should have the issued CSFM Test ID# on it

Section V - Responsibilities

Responsibilities of Pipeline Operator

- The pipeline operator is responsible for selecting the appropriate pipeline assessment method and length of test for a pipeline segment. **The Operator shall prepare and follow a written well developed Pressure Test Procedure.** This procedure should be made available to OSFM at the time of the Pressure Test.
- California Government Code Section §51014.5 requires that each pressure test be certified by an independent testing firm or person approved by OSFM.



The pipeline operator is responsible for ensuring individuals conducting pressure tests on their pipeline system are “operator qualified” per Subpart G of Part 195. Certification of an independent testing firm by the Office of the State Fire Marshal does not mean that individual employees of that firm are “operator qualified” to perform tasks on the pipeline.

The pipeline operator must notify fire departments local to the pipeline test segment at least three working days prior to each pressure test. It is not necessary to notify the local fire department when conducting a pressure for pretested pipe.

- **Any testing inconsistencies must be brought to the attention of OSFM.**
- It is the Pipeline Operator’s responsibility to verify the test results and ensure they are certified by an Independent Testing Firm.

Responsibilities of an Independent Testing Firm

An independent testing firm must assign a representative who is listed under that approved testing firm to the pressure test for the prescribed test duration. This individual shall monitor the test in its entirety, record the required data, evaluate and process the information, then forward the certified test results to the OSFM.

Additionally, the testing firm must:

- **Familiarize yourself with and follow the Operator’s written Pressure Test Procedure**
- Certify each of their employees
- Account for any fluid added or removed from line
- Observe and document test pressure for the required period
- Provide sketch or drawing of pipeline segment, appurtenances, valves, etc.



Independent testing firm shall not witness or certify a test conducted on a pipeline on which they have previously performed new construction or repair work.

Individuals who are conducting hydrostatic pressure tests must be “Operator Qualified”.

It is the responsibility of the Independent Testing Firm to ensure that any of their employees approved to perform pressure tests are included on the current OSFM List of Approved Hydrostatic Testing Companies.

The hydrostatic testing company's employee approved to conduct the testing must be present for the entire required test duration. The required test durations are:

8 HOURS

- Newly constructed pipelines and pipelines where any segment is not entirely visible
- Non-visible piping within the bulk loading facilities
- Pipelines in OSFM’s list of higher risk pipelines
- Pipelines tested per DOT Integrity Management Program

4 HOURS

- Pipelines tested solely for CAPSA Section 51013.5(b), (c), and (d)
- Pipelines where each segment under test is entirely visible (such as Pre-Tested Pipe or aboveground pipe)

The results of the hydrostatic pressure tests required by CAPSA Section 51013.5 shall be submitted by the independent testing firm or person within 30 days after completion of the test to the State Fire Marshal.

The independent testing firm shall not witness or certify a test conducted on a pipeline on which they have recently performed new construction or repair work. This does not

prohibit a testing firm or person from certifying test results on a pipeline they previously performed work on. The requirement is designed to prevent a company from witnessing and/or certifying results for pipeline segments where the company has performed the repair or installation.

Section VI – Best Practices

- **Safety is the number one priority during testing.**
- Have and follow the specific detailed hydrotest plan for the pipeline system at the test site.
- Have the pipeline’s physical characteristics data readily available at the test site.
- Have the current calibration records for the test equipment available at the test site.
- Have the current “operator qualification” records available at the test site.
- Hydrostatic pressure test-heads need to be completely welded (not just the root pass)
- Test-head welds need to be 100% X-rayed (before hydrostatic testing).
- Have pressure gauges installed at both ends of the tested line segment.
- Have enough pressure gauges installed on the line to prove continuity of the pressure test
- Plan to use more than one temperature measuring devices on a buried line to allow for temperature averaging.
- Do not bury the temperature probe next to the pipeline and then immerse the probe in puddle of water. This will falsify the temperature readings.
- Do not use a Thermal Coupling Temperature Probe as your ambient temperature probe.
- Use a pig and/or high point vents to eliminate air inside pipeline
- Be sure the Pipeline Operator is available throughout the period of testing to address any concerns that may arise and to sign the test record.
- Ensure all deviations or discontinuities during testing are accounted for and explained using visual inspection or engineering analysis

Case Study

A fatality occurred in the state of California while depressurizing a hazardous liquid pipeline into a vacuum truck:

A pipeline was being purged using nitrogen and two rubber spheres in preparation for a relocation tie-in. After the spheres reached the facility, as indicated by a pig-signal, a vacuum truck began receiving crude and nitrogen through a four-inch hose connected by a cam-lock to a six-inch line from the pipeline. Shortly after the vacuum truck was approximately ¼ full, the cam-lock connection separated, spraying the area with crude oil and fragments from a rubber sphere severely injuring two pipeline company employees. The pipeline company foreman later succumbed to the inhalation of crude oil.

All piping should be capable of withstanding anticipated pipeline pressure. Hard piped connections and baker tanks should be utilized. Vacuum truck hoses are not tested and rated to handle pressure surges that could result from purging operations.

Section VII – Advisory Bulletins

A list of Advisory Bulletins can be found by going to the link below:

<https://www.phmsa.dot.gov/standards-rulemaking/notices-and-advisory-bulletins>

Appendix A - Definitions

§195.2 – Definitions

The most up to date Definitions can be found at:

https://www.ecfr.gov/cgi-bin/text-idx?SID=ea38bb4d237e0d686f3ef789ca01e384&mc=true&node=se49.3.195_12&rqn=div8

Gathering Line means a pipeline 219.1 mm (8 5/8 inches) or less nominal outside diameter that transports petroleum from a production facility.

In-Plant Piping Systems means piping that is located on the grounds of a plant and used to transfer hazardous liquid or carbon dioxide between plant facilities or between plant facilities and a pipeline or other mode of transportation, not including any device and associated piping that are necessary to control pressure in the pipeline under §195.406(b).

Line Section means a continuous run of pipe between adjacent pressure pump stations, between a pressure pump station and terminal or breakout tanks, between a pressure pump station and a block valve, or between adjacent block valves.

Low Stress Pipeline means a hazardous liquid pipeline that is operated in its entirety at a stress level of 20 percent or less of the specified minimum yield strength of the line pipe.

Production Facility means piping or equipment used in the production, extraction, recovery, lifting, stabilization, separation or treating of petroleum or carbon dioxide, or associated storage or measurement. (To be a production facility under this definition, piping or equipment must be used in the process of extracting petroleum or carbon dioxide from the ground or from facilities where carbon dioxide is produced and preparing it for transportation by pipeline. This includes piping between treatment plants which extract carbon dioxide, and facilities utilized for the injection of carbon dioxide for recovery operations.)

Pipeline or Pipeline System means all parts of a pipeline facility through which a hazardous liquid or carbon dioxide moves in transportation, including, but not limited to, line pipe, valves and other appurtenances connected to line pipe, pumping units, fabricated assemblies associated with pumping units, metering and delivery stations and fabricated assemblies therein, and breakout tanks.

Appendix B - Test Notification Forms

Appendix B – Hydrostatic Test Notification Form HYD-1

Clear Save As



OFFICE OF THE STATE FIRE MARSHAL
 PIPELINE SAFETY DIVISION
 3780 Kilroy Airport Way, Suite 500
 Long Beach, CA 90806

NOTIFICATION OF HYDROSTATIC TEST

Operator must Email request to: PipelineNotification@fire.ca.gov

Operator Name:	
Operator ID:	
OSFM Line ID:	
	If the test includes multiple OSFM lines, a separate notification must be submitted for each individual OSFM Line ID
High Risk:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Company Performing Hydrotest:	
Person Requesting (Operator):	
Title:	
Address:	
City:	
State:	
Zip Code:	
Phone:	
Email:	
Test Date:	
Test Duration:	<input type="checkbox"/> 4 Hours <input type="checkbox"/> 8 Hours
Type of Test:	<input type="checkbox"/> OSFM High Risk <input type="checkbox"/> IMP (Part 195.452) <input type="checkbox"/> New Construction <input type="checkbox"/> Relocation <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year <input type="checkbox"/> 3 year <input type="checkbox"/> 5 year <input type="checkbox"/> Pre-tested Pipe <input type="checkbox"/> Facility (Includes: Valves, Receivers, In-plant Piping)
Test Medium:	<input type="checkbox"/> Water <input type="checkbox"/> *Other (OSFM Waiver Required, please attach justification)
If Other, List Test Medium:	
Length of Pipe Tested (feet):	
Proposed Test Pressure (psig):	
MOP of Pipeline (psig):	
Test Equipment Location:	

Comments:

The State Fire Marshal and the local fire department must be notified by the Operator at least 3 working days prior to the Hydrostatic Test for pipeline tests in public areas.

Please include a one-page PDF map of the proposed line that will be tested with this submission.

For Official Use, Only:

OSFM Test ID:	Notification Date:	Notification Received By:
Waiver Request Received Date:	Waiver Request Granted? <input type="checkbox"/> Yes <input type="checkbox"/> No	Waiver Approval Letter Sent Date:

If the Test Medium is NOT Water, a Waiver is Required.

Rev. 09/2019



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 Long Beach, CA 90806

Appendix B - In Line Inspection Form ILI-1

NOTIFICATION OF PROPOSED IN-LINE INSPECTION (In Lieu of Hydrostatic Test)

Operator must Email request to PipelineNotification@fire.ca.gov

Operator Name:		
Operator ID:		
OSFM Line ID:		
	If the test includes multiple OSFM lines, a separate notification must be submitted for each individual OSFM Line.	
High Risk:	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Company Performing Inspection (Tool Vendor)		
Person Requesting (Operator):		
Title:		
Address:		
City:		
State:		
Zip Code:		
Phone:		
Email:		
Anticipated Tool Run Date:		
Most Recent (i.e. Last) Tool Run Date and Tool Type:		
Integrity Assessment Frequency (years):		
Type of Test (choose more than one if applicable):	<input type="checkbox"/> IMP Assessment (Part 195.452) <input type="checkbox"/> CAPSA Requirement (Section 51013.5) <input type="checkbox"/> Other (Please Specify)	
ILI Tools (choose more than one if applicable):	Deformation <input type="checkbox"/> MFL: <input type="checkbox"/> <input type="checkbox"/> Axial <input type="checkbox"/> Transverse UT: <input type="checkbox"/> <input type="checkbox"/> Shear Wave <input type="checkbox"/> Compression Wave	Other <input type="checkbox"/> <input type="checkbox"/> Geospatial (XYZ) <input type="checkbox"/> Spiral <input type="checkbox"/> Guided Wave, etc.
If Other, Please Describe:		
MOP of Pipeline (psig):		
Hoop stress (% SMYS) at MOP:		
Length of Pipe Inspected (feet):		
Pipe Specification (Grade, Diameter, Wall thickness):		
Pipeline Year Constructed:		
Is this pipeline susceptible to longitudinal seam failure?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Launcher Location (Description and decimal GPS Coordinates):		
Receiver Location (Description and decimal GPS Coordinates):		
Comments:		

Please include a one-page map of the line that will be tested with this proposed ILI.

For Official Use, Only:

OSFM Test ID:	Notification Date:	Notification Received By:
Waiver Request Received Date:	Waiver Request Granted? <input type="checkbox"/> Yes <input type="checkbox"/> No	Waiver Approval Letter Sent Date:

This notification is your waiver request to perform an ILI in lieu of conducting a hydrostatic pressure test as required by OSFM.

Rev. 06/2021

Appendix C - Test Results Form

Clear Form



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 PIPELINE SAFETY DIVISION
 3780 Kilroy Airport Way, Suite 500
 Long Beach, CA 90806

Appendix D – Test Results Form HYD-3
 Revision Date: 04/2020

HYDROSTATIC TEST RESULTS/ PIPELINE DATA				
Test Date:		CSFM Test ID #		
Pipeline Operator:		Independent Testing Firm:		
Type of Test and Pipeline Identification (description, line number, name, pre-tested pipe, etc.)				
<input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Year <input type="checkbox"/> 3 Year <input type="checkbox"/> 5 Year <input type="checkbox"/> IMP (Part 195.452) <input type="checkbox"/> OSFM High Risk <input type="checkbox"/> Pre-tested pipe <input type="checkbox"/> New Construction <input type="checkbox"/> Relocation <input type="checkbox"/> Facility (includes: Valves, Receivers, In-plant Piping)				
Comment:				
Pipeline Location (mile post, street, station, etc.)				
From:				
To:				
CSFM Line ID#:				
Product Normally Transported:				
Test Medium :		<input type="checkbox"/> Water <input type="checkbox"/> Other (Specify)		
Location of Deadweight Tester: *			Deadweight Elevation (ft):*	
Elevation of Pipeline	High Point (ft):*		Low Point (ft):*	
Test Pressure	High Point (psig):*		Low Point (psig):*	
Maximum Operating Pressure (psig):*				
PIPE DATA				
Pipe O.D. (in.)	Wall Thickness (in.)	Specification & Grade (SMYS)	Length of test segment (ft)	Volume (Barrels)
TEST EQUIPMENT				
Make of Deadweight Tester		Serial #	Date Last Calibrated	
Make of Pressure Chart Recorder (1) / Gauge (2)		Serial #	Date Last Calibrated	
1) Recorder:				
2) Gauge:				
Make of Temperature Recorder (1) / Gauge (2)		Serial #	Date Last Calibrated	
1) Recorder:				
2) Gauge:				
GPS	Beginning Location:		Ending Location:	
Latitude:				
Longitude:				
* N/A is not acceptable in these fields.				

TEST DATA FOR CSFM TEST ID #							
Date	Time	Dead weight (psig)	Chart Pressure (psig)	Pipe Wall Temp. °F	Ambient Temp °F	Test Medium Change (+) Add/ (-) Drain (Gal.)	Comments
Net Change:							

LIST ALL LEAKS ON LINE PIPE RESULTING FROM UNSUCCESSFUL TEST ATTEMPTS		
LOCATION	CAUSE	
Approved Hydrostatic Testing Firm		
Name of Employee(s) and Company Conducting Test:		
Name of Independent Testing Firm Witnessing Test:		
Name of Certified Independent Witness on Site:		Date:
Pipeline Operator's Representative on Site:		Date:
Name of Person Certifying Test Data for Witnessing Firm:		Date:
Note:		

Appendix D - Hydrostatic Pressure Test Result Example

(To be added)

Appendix E - OSFM Approved Independent Testing Firms

The link to the Approved Hydrostatic Testing Companies can be found at the link below:

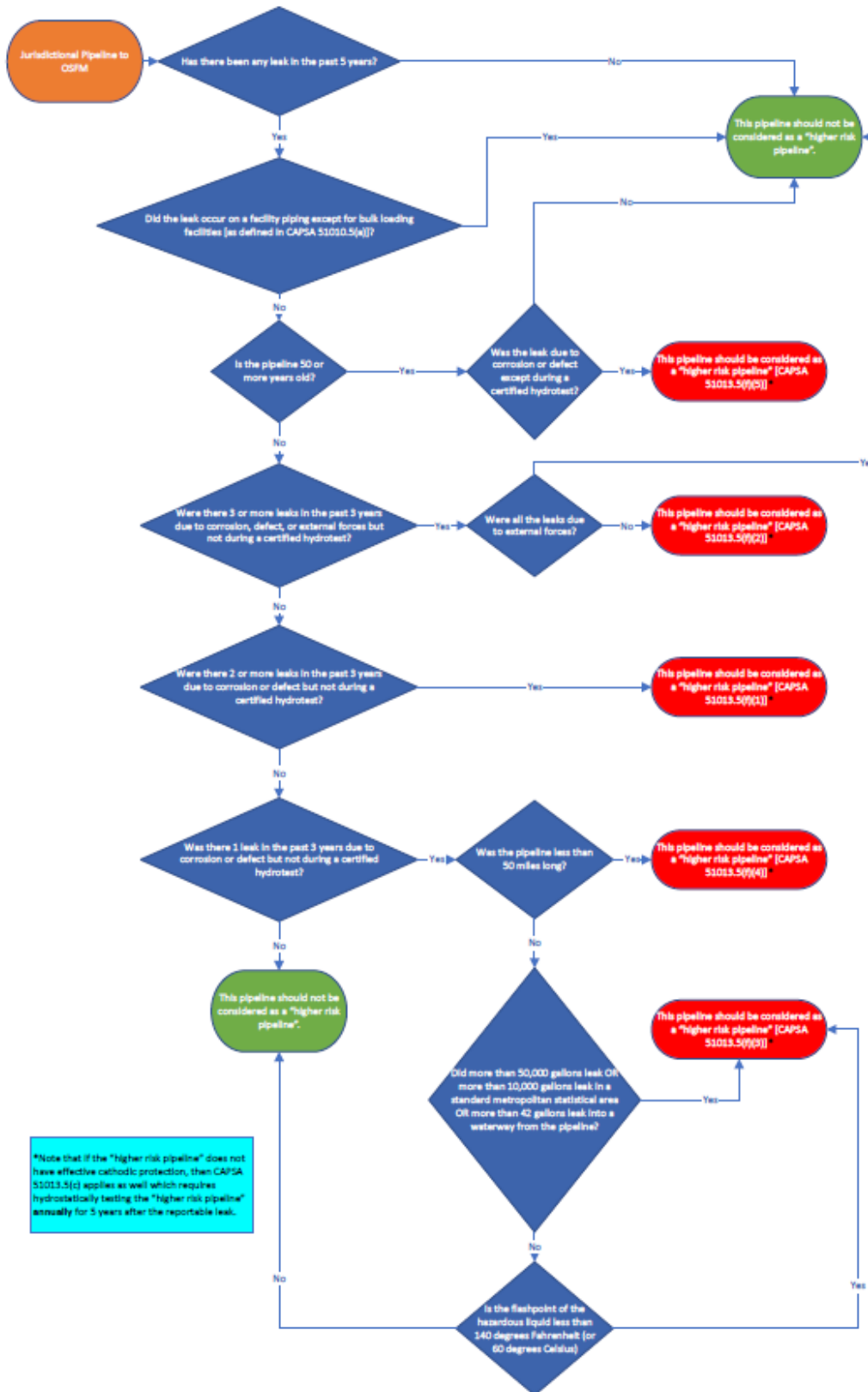
<https://osfm.fire.ca.gov/media/11418/approved-hydrostatic-testing-companies.pdf>

Appendix F – California Higher Risk Pipelines

What is a “Higher Risk” Pipeline?

1. Two or more reportable leaks due to corrosion or defect in the prior three years (not including leaks during certified pressure test).
2. Three or more reportable leaks due to corrosion, defects, or external forces, but not all due to external forces, in the prior three years (not including leaks during certified pressure test).
3. A reportable leak due to corrosion or defect of more than 50,000 gallons, or 10,000 gallons in a standard metropolitan statistical area, in the prior three years;
 - a. or a leak due to corrosion or defect which the State Fire Marshal finds has resulted in more than 42 gallons of a hazardous liquid within the State Fire Marshal's jurisdiction entering a waterway in the prior three years; or have suffered a reportable leak of a hazardous liquid with a flashpoint of less than 140 degrees Fahrenheit, or 60 degrees centigrade, in the prior three years.
4. Are less than 50 miles long, and have experienced a reportable leak, except during a certified hydrostatic pressure test, due to corrosion or a defect in the prior three years. For the purposes of this paragraph, the length of a pipeline with more than two termini shall be the longest distance between two termini along the pipeline
5. Have experienced a reportable leak in the prior five years due to corrosion or defect, except during a certified hydrostatic pressure test, on a section of pipe more than 50 years old. For pipelines which fall in this category, and no other category of higher risk pipeline, additional tests required by this subdivision shall be required only on segments of the pipe more than 50 years old as long as all pipe more than 50 years old which is within 20 pipeline miles from the leak in all directions along an operator's pipeline is tested.
6. NOTE: Only CAPSA regulated pipelines can potentially be a higher risk pipeline. Facility piping, and onshore gathering pipelines are not under CAPSA jurisdiction and so cannot be “higher risk” pipelines.

Flow Chart to Determine Higher Risk Pipeline [CAPSA 51013.5(f)]



Appendix G - California Hydrostatic Pressure Testing Statutes

§51013.5 - Required Testing

- (a) Every newly constructed pipeline, existing pipeline, or part of a pipeline system that has been relocated or replaced, and every pipeline that transports a hazardous liquid substance or highly volatile liquid substance, shall be tested in accordance with Subpart E (commencing with Section §195.300) of Part §195 of Title 49 or the Code of Federal Regulations.
- (b) Every pipeline not provided with properly sized automatic pressure relief devices or properly designed pressure limiting devices shall be hydrostatically tested annually.
- (c) Every pipeline over 10 years of age and not provided with effective cathodic protection shall be hydrostatically tested every three years, except for those on the State Fire Marshal's list of higher risk pipelines, which shall be hydrostatically tested annually.
- (d) Every pipeline over 10 years of age and provided with effective cathodic protection shall be hydrostatically tested every five years (THIS IS NO LONGER APPLICABLE DUE TO INTEGRITY MANAGEMENT PROGRAM) Hydrotests shall be conducted no later than a five-year cycle on all pipelines, except for those pipelines on the State Fire Marshal's list of higher risk pipelines which shall be hydrostatically tested every two years.
- (e) Piping within a refined products bulk loading facility served by pipeline shall be tested hydrostatically at 125 percent of maximum allowable operating pressure utilizing the product ordinarily transported in that pipeline if that piping is operated at a stress level of 20 percent or less of the specified minimum yield strength of the pipe. The frequency for pressure testing these pipelines shall be every five years for those pipelines with effective cathodic protection and every three years for those pipelines without effective cathodic protection. If that piping is observable, visual inspection may be the method of testing.
- (f) Beginning on July 1, 1990 and continuing until the regulations adopted by the State Fire Marshal pursuant to subdivision (g) take effect, each pipeline within the State Fire Marshal's jurisdiction which satisfies any of the following sets of criteria shall be placed on the State Fire Marshal's list of higher risk pipelines until five years pass without a reportable leak due to corrosion or defect on that pipeline. Initially, pipelines on that list shall be tested by the next scheduled test date, or within two years of being placed on the list, whichever is first. On July 1, 1990, pipeline operators shall provide the State Fire Marshal with a list of all their pipelines, which satisfy the criteria in this subdivision as of July 1, 1990. If any pipeline becomes eligible for the list of higher risk pipelines after that date, the pipeline company shall

report that fact the State Fire Marshal within 30 days, and the pipeline shall be placed on the list retroactively to the date on which it became eligible for listing. Pipelines, which are found to belong on the list, but are not so reported by the operator to the State Fire Marshal, shall be placed on the list retroactively. Operators failing to properly report their pipelines shall be subject to penalties under Section §51018.6. Pipelines not covered under the risk criteria developed pursuant to subdivision (g) shall be deleted from the list when Regulations are adopted pursuant to that subdivision. For purposes of this subdivision, a leak which is traceable to an external force, but for which corrosion is partly responsible, shall be deemed caused by corrosion, "defect" refers to manufacturing or construction defects, and "leak" or "reportable leak" means a rupture required to be reported pursuant to Section §51018. As long as all pipelines are tested in their entirety at least as frequently as standard risk pipelines under subdivisions (c) and (d), it shall suffice for additional tests on higher risk pipelines to cover 20 pipeline miles in all directions along an operator's pipeline from the position of the leak or leaks which led to the inclusion or retention of that pipeline on the higher risk list. The interim list shall include pipelines, which meet any of the following criteria:

- (1) Have suffered two or more reportable leaks, not including leaks during a certified hydrostatic pressure test, due to corrosion or defect in the prior three years;
- (2) Have suffered three or more reportable leaks, not including leaks during a certified hydrostatic pressure test, due to corrosion, defects, or external forces, but not all due to external forces, in the prior three years;
- (3) Have suffered a reportable leak, except during a certified hydrostatic pressure test, due to corrosion or defect of more than 50,000 gallons, or 10,000 gallons in a standard metropolitan statistical area, in the prior three years; or have suffered a leak due to corrosion or defect which the State Fire Marshal finds has resulted in more than 42 gallons of a hazardous liquid within the State Fire Marshal's jurisdiction entering a waterway in the prior three years; or have suffered a reportable leak of a hazardous liquid with a flashpoint of less than 140 degrees Fahrenheit, or 60 degrees centigrade, in the prior three years.
- (4) Are less than 50 miles long, and have experienced a reportable leak, except during a certified hydrostatic pressure test, due to corrosion or a defect in the prior three years. For the purposes of this paragraph, the length of a pipeline with more than two termini shall be the longest distance between two termini along the pipeline.
- (5) Have experienced a reportable leak in the prior five years due to corrosion or defect, except during a certified hydrostatic pressure test, on a section of pipe more than 50 years old. For pipelines which fall in this category, and no other category of higher risk pipeline, additional tests required by this subdivision shall be required only on segments of the pipe more than 50 years old as long as all pipe more than 50 years old which is within 20

pipeline miles from the leak in all directions along an operator's pipeline is tested.

- (g)
- (h) In addition to the requirements of subdivisions (a) to (e) inclusive, the State Fire Marshal may require any pipeline subject to this chapter to be subjected to a pressure test, or any other test or inspection, at any time, in the interest of public safety.
- (i) Test methods other than the hydrostatic tests required by subdivisions (b), (c), (d), and (e), including inspection by instrumented internal inspection devices, may be approved by the State Fire Marshal on an individual basis. If the State Fire Marshal approves an alternative to a pressure test in an individual case, the State Fire Marshal may require that the alternative test be given than the testing frequencies specified in more frequently subdivisions (b), (c), (d), and (e).
- (j)

§51014 -Testing procedure pursuant to Section §51013.5; Test Pressure.

- (a) The pressure tests required by subdivisions (b), (c) and (d) of Section §51013.5 shall be conducted in accordance with Subpart E (commencing with Section §195.300) of Part 195 of Title 49 of the Code of Federal Regulations, except that an additional four-hour leak test, as specified in Section §195.302(c) of Title 49 of the Code of Federal Regulations, shall not be required under subdivisions (b), (c) and (d) of Section §51013.5. The State Fire Marshal may authorize the use of liquid petroleum having a flashpoint over 140 degrees Fahrenheit or 60 degrees centigrade as the test medium. The State Fire Marshal shall make these authorizations in writing.
- (b) Test pressure shall be at least 125 percent of the actual pipeline operating pressure.

§51014.3 - Notice to State Fire Marshal prior to hydrostatic test

- (a) Each pipeline operator shall notify the State Fire Marshal and the local fire department having fire suppression responsibilities at least three working days prior to conducting a hydrostatic test, which is required by this chapter. The notification shall include all of the following information:
 - (1) The name, address and telephone number of the pipeline operator.
 - (2) The specific location of the pipeline section to be tested and the location of the test equipment.

- (3) The date and time the test is to be conducted.
 - (4) An invitation and a telephone number for local fire departments to call for further information on what they should do in event of a leak during testing.
 - (5) The test medium
 - (6) The name and Telephone/Fax numbers of the independent testing firm or person responsible for certification of the test results.
- (b) The State Fire Marshal may observe tests conducted pursuant to this chapter.

§51014.5 - Certification and submission of test results

- (a) When hydrostatic testing is required by Section §51013.5, the test results shall be certified by an independent testing firm or person who is selected from a list, provided by the State Fire Marshal, of independent testing firms or persons approved annually by the State Fire Marshal. The State Fire Marshal may charge a fee for consideration and approval of an independent testing firm or person pursuant to this subdivision, not to exceed the reasonable costs of that consideration and approval.
- (b) The results of the tests required by Section §51013.5 shall be submitted by the independent testing firm or person within 30 days after completion of the test to the State Fire Marshal, who may review the results. The report shall show all of the following information:
- (1) The date of the test
 - (2) A description of the pipeline tested including a map of suitable scale showing the route of the pipeline.
 - (3) The results of the test
 - (4) Any other test information that may be specifically requested by the State Fire Marshal.
- (c) The State Fire Marshal shall not supervise, control or otherwise direct the testing.

Appendix H - U.S. DOT Integrity Management Regulations

Please see eCFR link below:

https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&ty=HTML&h=L&mc=true&=PART&n=pt49.1.195#sq49.3.195_1450.sg1

Appendix I - Standard Pressure - Temperature Formula

CSFM Standardized formulae for performing pressure – temperature calculations to determine volume change are as follows:

Basic Formula: $\Delta V / V = K_p \Delta P + K_t \Delta T$

Where: $K_p = [(D / t) (5 / 4 - \mu) / E] + 1 / \beta = (1.9 D / 2 E t) + 1 / \beta$

And: $K_t = 3a - g$

ΔP	=	Liquid Pressure Change
ΔT	=	Liquid Temperature Change
ΔV	=	Liquid Volume added to that inside the pipe (negative if flows out)
V	=	Nominal Pipe Volume = $\pi D^2 L / 4$
D	=	Inside Pipe Diameter
L	=	Pipe Length
t	=	Pipe wall thickness
μ	=	Poisson's ratio for steel = 0.3
E	=	Young's Modulus for steel = $30 * 10^6$ psi
β	=	Liquid Bulk Modulus, a function of Pressure and Temperature
g	=	Liquid Volumetric expansion coefficient, a function of Pressure and Temperature
a	=	Linear coefficient of Thermal Expansion for steel = $6.5 * 10^{-6}$ (per $^{\circ}F$)