

Hydrostatic Pressure Testing on Operating Pipelines:

A safety and integrity process that measures safe operating pressures

Enbridge is committed to maintaining high standards of pipeline integrity as part of our comprehensive safety and environment programs. Our system integrity procedures promote safe operations for the protection of our pipelines to provide reliable delivery of the liquid petroleum and natural gas liquids that we transport for our customers in America's heartland and beyond. Safe and reliable operations support our goal of protecting the landowners, tenants, communities and environments along our pipeline routes.

We use a number of technologies to verify the safety and integrity of our pipelines so that regulators and the public can have confidence our pipelines will perform safely and reliably. Our comprehensive safety measures begin with quality materials and continue with high-quality design and construction standards, hydrostatic testing prior to operating new pipelines, as well as employing 24-hour computerized pressure monitoring, routine route surveillance, and promoting on-going industry-leading integrity and maintenance programs.

What is Hydrostatic Pressure Testing?

Hydrostatic testing is used to confirm safe operations of our system by testing pipe integrity using water pressurized above normal operating levels. This test is performed following all new pipeline construction prior to placing a pipeline into service. Hydrostatic testing can also be performed on existing pipelines that are already in service to confirm pipeline integrity and shipping capacity.

The following process is typically used when hydrostatic pressure testing a section of existing pipeline that is currently operating:

- A batch of water that includes non-toxic coloring, or dye, is injected into the pipe between batches of oil being transported as part of normal operations. The water and oil are separated and sealed from each other by urethane cylinders (referred to as "pigs"), and then the batch is moved through the line until it reaches the identified segment of pipe for testing.

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Under controlled conditions, specially placed hoses pump non-toxic colored water into the pipeline to build up the pressure in the section being tested to above operating pressures. Hydrostatic testing pressures must be raised and held at that high level until integrity criteria are met to comply with specific, regulatory standards. While the process can take one to two weeks per segment to complete, the actual hydrostatic pressure test can typically be completed in less than a day. The batch of testing water is separated and sealed by urethane cylinders ("pigs") from the oil being transported.



- Next, pressure is raised by pumping additional water from tank trucks or a nearby approved water source into the segment of pipe. The pressure of the segment is then raised to reach and maintain the desired test levels and time period. The purpose of a hydrostatic test is to verify the pipeline is capable of withstanding an even higher pressure than the maximum operating pressures that will be established as limits during subsequent normal operations. If there is a leak of water during the test, it is located, and the affected section is repaired and re-tested. Dyeing the water with a non-toxic identifiable color is done to aid in locating a leak, should one occur.
- During the testing process, the segment of pipeline under pressure is patrolled by helicopter as well as on foot. Pressures are monitored using sophisticated computer data programs.
- Enbridge and Enbridge-contracted crews monitor the test and are ready to repair or replace sections of pipe or components that may fail during the test. Crews will operate fill pumps, pressure pumps, compressors, setting up test instrument shelters, running a winch truck, monitoring gauges and recording test data.
- After the test, the water is transported down the pipeline to an Enbridge facility, typically into a tank at one of our terminals. The water is tested, stored, treated or otherwise disposed in accordance with local, state and federal regulations and/or environmental permits.
- An internal inspection of the pipeline using a tool called a smart pig provides additional data on the pipeline's condition as well as removing remaining water and other potential contaminants.
- Any exposed area of pipe that was accessed during the test is backfilled, and property is restored.
- Normal shipment of North American crude oil resumes in the pipeline to be safely delivered to refinery customers and made into products we all depend on in our daily lives.

What to Expect

Landowners and tenants along the pipeline route will be notified by letter announcing the test dates and general location of the pipeline segment being tested. During the actual test period, signs will also be posted along public access areas near the segment of pipeline being tested.

Landowners and tenants along the pipeline route can expect the following:

- Temporary work activity along the pipeline route;
- Temporary elevated noise levels in the limited locations where test equipment is set-up and where personnel are working; and,
- Approximately one to two weeks of work activity depending on the pressure test results and ability to sustain required pressure levels. Work may occur at night as well as during the day in order to attain the prescribed duration, typically a minimum of eight sustained hours at maximum pressure. However, few landowners and tenants will be affected or notice much change from normal activity levels.

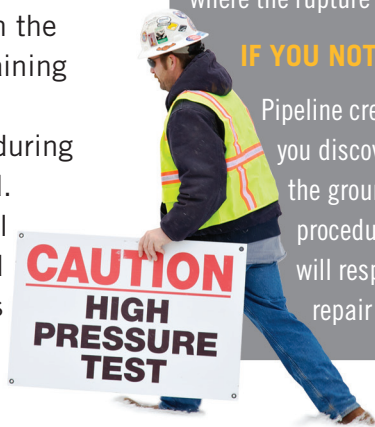
We apologize for any inconvenience.

FOR YOUR SAFETY PLEASE AVOID THE PIPELINE RIGHT-OF-WAY DURING THE TESTING PROCESS

If a pipe fails during the test, the pressurized testing water may briefly spray into the air and eventually pool on the ground. Do not go near the leak as the test water may be concealing a deep hole where the rupture occurred.

IF YOU NOTICE A LEAK, CALL 1-800-858-5253

Pipeline crews will be monitoring the line; however, should you discover a rupture or a pool of colored water on the ground near a test site, please follow standard procedures for contacting Enbridge. Enbridge crews will respond immediately to clean up the area and repair the pipe.



The pressure testing confirms a threshold measurement for safe operations of that particular line. Typically hydrostatic test pressures are about 1.25 to 1.5 times higher than the normal maximum operating pressure. Signs are posted at public access points along the testing area to keep the public at least 100 feet away from the pipe for that brief time.