



Crude oil storage terminals have built-in safety including computerized and manual shut-off valves for the piping and manifold systems, containment dikes around the tanks and floating roofs that minimize evaporation and capture emissions from the stored crude oil.

## Crude Oil Storage Terminals Provide Quality and Safety Control Points, as well as Serve as Hubs for Refinery Markets

Enbridge crude oil tank facilities temporarily store crude oil as it is moved through our pipeline system to be delivered to refineries serving consumers. Crude oil tank facilities - also called terminals - are an integral part of our interstate transportation system and serve important operational functions, including:

- 1. Safety control points** – Our pipelines are long-distance interstate transportation systems moving crude oil and liquid petroleum hundreds and often thousands of miles. Our breakout tanks are regulated as part of the interstate pipeline system and offer safety control points along the route supplemented by isolation valves and other containment mechanisms.
- 2. Product quality control points** - Our pipelines transport a variety of grades of crude oil, which flow in product batches. Our tank facilities separate these batches and facilitate quality testing prior to delivery to our customers.
- 3. Customer scheduling and inventory management** – Breakout storage terminals receive and store liquid petroleum temporarily and are generally regulated under the Pipeline Safety Act by the U.S. Department of Transportation. In addition to serving as required breakout and safety relief, tanks also meet our customers' short-term needs for storage, allowing our shippers flexibility in delivering their products. Pipelines then deliver the crude oil or petroleum to refineries, where it is refined into vital products used daily by consumers and businesses throughout North America.

In addition to tanks, Enbridge storage terminals may include pump stations, booster pumps and manifold systems that route the different types of oil we transport between tanks and pipelines. Terminals typically also have electrical substations and switchgear stations and onsite computerized control systems.

## FAST FACTS ON TERMINALS

- Terminal locations vary from small gathering sites in North Dakota to the largest terminal in the world in Cushing, Okla. Our tanks range in size from 40 to 60 feet high, and 150 to 270 feet in diameter, holding anywhere from 57,000 to 575,000 barrels of crude oil. The size of the tank is determined by the design requirements of pipeline and refinery customers.
- Floating roofs on storage tanks are made with primary and secondary seals to contain vapors. These seals are located near the surface of the oil and reduce emissions as well as risk of ignition.
- State-of-the-art systems ranging from radar that tracks tank levels to mixers are used to maintain product integrity during breakout storage.
- In the United States, Enbridge operates 12 crude oil storage terminals with a total of 180 tanks. The terminals are staffed by trained employees who live in nearby communities.
- Enbridge terminals are federally regulated and must comply with comprehensive Department of Transportation requirements that govern everything from design, maintenance, and size of tanks; to safety measures including containment berms; to regulations for air quality and other environment permitting.

## Building In Safety

Enbridge storage terminals are well-maintained facilities that have been designed, built, and located to minimize public impact. Terminal facilities are secured and fenced, with lighting designed to provide security yet minimal disturbance to neighbors. And, as part of an interstate transportation system, these terminals and the facilities located on them are regulated by the Department of Transportation's Office of Pipeline Safety under the Code of Federal Regulations, Title 49, Part 195. Federal pipeline safety inspectors monitor compliance with these rules.

Enbridge storage terminals support our efforts of safely and reliably delivering North American petroleum to North American refineries to make into products we all rely on every day.

All new Enbridge above-ground breakout storage tanks are constructed using quality steel plate engineered to exacting federal codes and national standards for the size, environment and product to be stored. Among other integrity testing, new tanks are filled with water and monitored for potential leaks during hydrostatic testing prior to being placed into service. In addition, cathodic protection provides corrosion control as normal operations are engaged. Tanks are also grounded to minimize static electricity build up during filling and refilling, and to redirect lightning strikes, should any occur.

All of our facilities are routinely monitored, inspected and maintained. Trained terminal personnel complete a visual inspection of every tank at least monthly. Additional annual inspections are also performed. Every five years, an extensive in-service inspection is performed; and, at least every 20 years, tanks are taken out of service for a full cleaning and inspection internally and externally.

Although a major release at a storage terminal is highly unlikely, Enbridge personnel are trained



**Enbridge terminals are designed to support the products we transport and store. Facilities are engineered and constructed using current state-of-the-art technologies and specifications that meet strict regulatory requirements with regard to quality materials and construction, containment and other safety backups.**

and prepared to respond immediately. All terminal locations are monitored 24-hours a day from a state-of-the-art control center, and multiple on-site systems are in place to promptly initiate remote shutdown and isolation, if needed.

Should a tank experience a release, primary and secondary containment measures are in place, including lined dikes surrounding each tank that can hold 110 percent or more of the petroleum stored in the tank. So, in the unlikely event of a release, petroleum would be contained on Enbridge property and promptly recovered and the area cleaned.

Crude oil storage terminals are a critical component of the Enbridge energy transportation system. As our pipeline capacity grows to meet growing U.S. consumer demand for North American petroleum products, we are moving forward to reliably meet this need with safety as a top priority.