



# LINE 3 INTEGRITY

## What You Need to Know

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**In 2003, both the Minnesota Pollution Control Agency (MPCA) and the Minnesota Office of Pipeline Safety (MN OPS) wrote letters to the Pipeline and Hazardous Materials Safety Administration (PHMS) stating their concern over Line 3.** The MPCA's letter included these facts:

- MPCA has records of nearly three dozen non-third-party spills, leaks, or ruptures of Line 3 between 1972 and 2003
- About 87% of the pipeline petroleum spills in Minnesota in the period of 1991-2002 were from Line 3.
- About 48% of all petroleum spilled from all sources in Minnesota was from Line 3

Line 3 was responsible for the 1.7 million gallon spill in 1991 in Grand Rapids and the 2002 250,000 rupture in Cohasset. The Grand Rapids spill was between a college and an apartment building. But for incredible luck an inferno could have resulted. 300,000 gallons of the Grand Rapids spill flowed to a river. Luck with the timing of the spill; river-ice conditions; and an aggressive and organized recovery by the company kept hundreds of thousands of gallons of crude oil from entering the Mississippi River. Oil in the Mississippi would likely have fouled St. Cloud, St. Paul, and Minneapolis drinking water intakes for months. Likewise, the Cohasset spill could have easily entered the Mississippi River if it had happened in a different segment of Line 3.

**2007-2008, a focus group within Enbridge recommended that segments of Line 3 be replaced because of the high density of identified anomalies.** At that time, the optimal maintenance approach was determined to be lowering the pressure on the pipeline in successive steps, which deferred the immediate need for pipeline replacement. In 2008, Line 3's capacity was 503,000 bpd of mixed service, and by 2010, it had been lowered to a capacity of 390,000 bpd of light crude oil. This lowered pressure maintained a safety factor on the line, deferred some of the maintenance work on the anomalies, and still allowed the pipeline to function, albeit at a much reduced rate.

In the U.S. alone, approximately 4,000 integrity digs were forecast during the following 15 years to maintain Line 3 at its reduced level of operation. Dig and repair costs were forecasted to exceed \$6 billion through the year 2026, and replacing the segments in the worst integrity condition would only lower the forecasted cost to \$4.3 billion. Further pressure reductions could not be implemented because the pipeline was already operating at the lowest operable pressures.

**What is the current estimated cost to continue a dig and repair program on Line 3, and how does it compare to the replacement cost estimate?**

Conceptually, it may be possible to restore Line 3 to its original operating capacity **if Enbridge invested nearly \$8 billion in repairs** over the next 15 years in Canada and the U.S., with approximately **\$2 billion in the U.S. alone.** However, in reality, it is not feasible to conduct such an

extensive dig and repair program, which would require multiple digs in concentrated areas. The resources required, and the impact to the environment and landowners along the pipeline, would be extraordinary. Moreover, since the total estimated cost to replace Line 3 is \$7.5 billion (approximately \$2.1 billion for the U.S. portion), we are at the approximate break-even point when comparing the cost of replacement to the present value of continued repairs.

Compliance with the requirements of the proposed Consent Decree will increase the capital expenditure requirements of Line 3 in the range of \$5 million to \$40 million per year in the U.S. starting in 2018 until Line 3 is permanently deactivated. In addition, compliance with the proposed Consent Decree will increase operating expenses (mainly for ILI) approximately \$8.5 million per year in the U.S. until Line 3 is permanently deactivated, which is up to 3 times the current amount, depending on the date Line 3 is retired.

### What do we know about the integrity of Line 3?

According to their most recent publicly disclosed inspection records:

- Over 70 percent of the 140,000 pipe sections between welds (referred to as “pipe joints”) are experiencing external corrosion;
- Corrosion deeper than 50 percent of the pipe wall thickness would increase to affect over 3,000 of the pipe joints in 2016 – an increase from approximately 900 pipe joints in 2012; and
- Over 25,500 pipe joints will have a corrosion depth of 50 percent or greater by 2030 – an increase from approximately 18,000 pipe joints forecast for 2027
- Ten times as many corrosion anomalies per mile (with a depth of more than 20 percent of the pipe wall thickness) than any other Enbridge pipeline in the same corridor.
- SCC affecting over 15 percent of the pipe joints, and five times as many SCC anomalies per mile (with a depth of more than 10 percent of the pipe wall thickness) than any other Enbridge pipeline in the same corridor.

### Why is this pipeline in such bad condition?

Line 3 in the U.S. was built in 1962/1963 with two characteristics that make this pipeline particularly susceptible to three integrity threats. **First, on Line 3 in Minnesota**, 84 percent of the coating is Polyethylene (“PE”) tape, which has been found to disbond from the pipe, making the pipeline more susceptible to both external corrosion and SCC. **Second, on Line 3 in the U.S.**, 53 percent of the longitudinal welds are flash welded (“FW”), which was a pipe manufacturing process that has an inherently higher susceptibility to the formation of defects along the long seam of the pipe. Although not all FW pipe contain manufacturing defects, there are FW segments of Line 3 where the combination of these defects and internal pipeline pressure developed into long-seam cracking and contributed to some of the historical failures, including the **1991 1,700,000 gallon Grand Rapids Spill- the largest inland spill in history.**



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