

LOC SCENARIOS AND FREQUENCIES

Transport pipelines can fail due to internal causes (e.g. corrosion, pressure above design pressure) and due to external interference (e.g. groundwork). The safety study will assess two possible LOC scenarios: a rupture of the pipeline and a leak of the pipeline. In Table 10-1 and Table 10-2 the LOC scenarios and their corresponding frequencies are listed. These were taken from the Reference Manual Bevi Risk Assessments (MBRA).

Table 10-1: LOC scenarios for underground transport pipelines

	Frequency (per meter per annum) Pipeline in pipe bay	Frequency (per meter per annum) Pipeline complies with NEN 3650	Frequency (per meter per annum) Other pipelines
1. Rupture in the pipe	7×10^{-9}	1.525×10^{-7}	5×10^{-7}
2. Leak with a diameter of 20 mm	6.3×10^{-8}	4.575×10^{-7}	1.5×10^{-6}

Table 10-2: LOC scenarios for aboveground pipelines

	Frequency (per meter per annum) nominal diameter < 75 mm	Frequency (per meter per annum) 75 mm ≥ nominal diameter ≤ 150 mm	Frequency (per meter per annum) nominal diameter > 150 mm
1. Rupture in the pipe	1×10^{-6}	3×10^{-7}	1×10^{-7}
2. Leak with an effective diameter of 10% of the nominal diameter, up to a maximum of 50 mm	5×10^{-6}	2×10^{-6}	5×10^{-7}

The failure frequencies for underground pipelines are lower than aboveground pipelines because underground pipelines are more protected against external impact. Underground pipelines can have different additional safety measures, both technical and organizational, which will influence the failure frequencies. For this reason three different failure frequencies can be used for underground pipelines.

The high pressure pipeline is not located in a pipe bay, but the pipeline complies with NEN 3650 and therefore these failure frequencies are used for the risk calculations for the underground sections. For the pipeline sections crossing the waterways the failure frequency for a pipeline in a pipe bay is used as it is highly unlikely that this segment is damaged by impact.

Source: <http://hub.globalccsinstitute.com/publications/co2-liquid-logistics-shipping-concept-llsc-safety-health-and-environment-she-report/102>