
**Petroleum and natural gas industry —
Pipeline transportation systems —
Geological hazard risk management
for onshore pipeline**

*Industrie du pétrole et du gaz naturel — Systèmes de transport
par conduites — Gestion des risques géologiques pour les conduites
terrestres*

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 2, *Pipeline transportation systems*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is used by pipeline operators and designers for the implementation and improvement of geohazard risk management of onshore pipelines.

It is used for the orderly and effective identification, assessment and mitigation of geohazards threatening the integrity or safety of the pipeline, and to reduce the potential for risks and accident loss. This document is intended to address geohazards along the pipeline and right-of-way (RoW).

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Petroleum and natural gas industry — Pipeline transportation systems — Geological hazard risk management for onshore pipeline

1 Scope

This document specifies requirements and gives recommendations on the management of geohazard risks during the pipeline design, construction and operational periods.

This document is applicable to all operators and pipelines (existing and proposed/under construction).

This document applies to onshore gathering and transmission pipelines used in the petroleum and natural gas industries.

NOTE This document is not applicable to piping and pipelines within well-defined plants and facilities, such as pump or compressor stations, processing facilities or refineries. It is assumed that the facility site as a whole will be subject to a separate geohazard assessment to evaluate applicable natural and man-made hazards. Nevertheless, this document can provide useful guidance for assessing the geohazard threat to facilities, including the pipelines within the facility.

This document is applicable to all reasonable and credible natural hazards induced by natural forces and hazards induced by human activity that manifest similarly to natural hazards collectively referred to as “geological hazards” or “geohazards”, or through industry as attributed to “natural forces”. Geohazards covered by this document include, but are not limited to (not given in order of significance):

- mass wasting processes, including landslides, lateral spreads, rockfalls, debris flows, avalanches, and similar processes whether naturally occurring or anthropogenic;
- land subsidence and/or sinkhole formation, whether naturally occurring such as from dissolution of salt or carbonate rock formations (karst formation) or human caused, such as from underground mining or withdrawal of subsurface fluids such as groundwater and oil and gas;
- seismic hazards, such as ground shaking, fault rupture, liquefaction, flow failures and lateral spreading or associated secondary effects, such as seismically triggered landslides;
- volcanic hazards, such as lahars, pyroclastic flows, lava flows, dam break, and volcanically induced seismicity (excluding ashfall), where such hazards can be reasonably predicted;
- hydrologic processes, such as flooding, vertical scour of river bottoms, channel migration and bank erosion, channel avulsion, rapid lake drainage;
- permafrost/periglacial processes and geothermal effects, such as thermal degradation, frost heave or thaw settlement, thermal erosion, thermokarst;
- surface (overland), trench backfill, or earthwork fill erosion;
- expansion or collapsing processes caused by expansive and collapsible soils, such as glaciomarine clays, collapsible loess, etc.

This document is not applicable to atmospheric/environmental effects, such as the following:

- high winds induced from hurricanes and tornadoes and similar storms, except where such events are reasonably predictable and will induce geohazards such as landslides, erosion, etc.;
- lightning;
- forest or brush fires;