

CO₂PIPEHAZ: QUANTITATIVE HAZARD ASSESSMENT FOR NEXT GENERATION CO₂ PIPELINES

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ABSTRACT

This paper presents an overview of the recently commenced CO₂PipeHaz project focused on the hazard assessment of CO₂ pipelines to be employed as an integral part of the Carbon Capture and Storage (CCS) chain. Funded by the European Commission FP7 Energy programme, the project's objective is to address the fundamentally important and urgent issue regarding the accurate predictions of fluid phase, discharge rate and subsequent atmospheric dispersion during accidental releases from pressurised CO₂ pipelines. This information is pivotal to quantifying all the hazard consequences associated with failure of CO₂ transportation pipelines forming the basis for emergency response planning and determining minimum safe distances to populated areas. The developments of the state of the art multi-phase heterogeneous discharge and dispersion models for predicting the correct fluid phase during the discharge process will be given special consideration given the very different hazard profiles of CO₂ in the gas and solid states. Model validations are based on both small scale controlled laboratory conditions as well as large scale field trials using a unique CCS facility in China, the world's largest CO₂ emitter. A cost/benefit analysis will be performed to determine the optimum level of impurities in the captured CO₂ stream based on safety and economic considerations. The project will embody the understanding gained within safety and risk assessment tools that can be used for evaluating the adequacy of controls in CO₂ pipelines, with best practice guidelines also being developed.

Key words: CO₂, pipeline transportation, accidental discharge, CCS

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