SERVICE DE METROLOGIE NUCLEAIRE
INDUSTRIAL RISK

MASTER THESES

Academic year **2022-2023**

Safety risks associated with storage and transport through pipelines of CO_2 (in collaboration with Tractebel Engie)

D. Seys (damien.seys@tractebel.engie.com), P.E. Labeau (pierre.etienne.labeau@ulb.be)

For master thesis and internship

Context

In the context of energy transition, CO2 will be more and more captured and stored or re-purposed. For instance, CO2 can be combined with hydrogen to produce e-methane. This would decarbonize the activities of industrial sectors which are, for the moment, releasing significant amounts of CO2. It would also decarbonize sectors which are not (yet) ready for electrification, e.g. airplanes. In relation to safety there are no consolidated approach and models regarding the management of risks during the different phases of such projects.

Objective

The objectives of this master thesis are: - To review the hazards and risks associated with CO2 (transport, storage); - To investigate the existing technology for transporting, using and storing CO2; - To study accidents or incidents which have occurred with CO2, their causes and their consequences; - To search for international standards / guidance / national guidelines regarding the transport, use and storage of CO2; - To update the existing technical code for risk assessment of pipelines, to make it applicable to CO2 pipelines (currently it is applicable for flammable gases) - To define a methodology for modelling CO2 pipelines incidents (leaks, etc.): comparison of models, assumptions, sensitivity study to identify the most important parameters, etc. This comprises the comparison related to dispersion of existing empiric computer models (PHAST DNV used by TRACTEBEL) with 3D – CFD models.

It is preferred to associate this master thesis with an internship in the Risk & Safety Management team of TRACTEBEL, the engineering company of the ENGIE Group, active in many sectors – energy, urban, water & nuclear. It will be an opportunity to work with experienced colleagues in the field of risk management, have contact with clients developing infrastructure for the future, to get familiarized with industrial software for modelling of accidents, and to discover a rich and stimulating work environment in TRACTEBEL.