VEAS, Norway’s largest wastewater treatment plant, is setting out to produce Liquid Biogas (LBG) for carbon-neutral public transportation in the Oslo area. Gexcon has assisted VEAS in assessing the risk and establishing a risk analysis for approval by the Norwegian Directorate for Civil Protection (DSB).

**VEAS’s challenge**

VEAS is located in Asker, south of Oslo, and treats wastewater from 600,000 inhabitants in the greater Oslo region. Off-gas from sewage treatment is to be purified and liquified in a new LBG plant on their site. On the surrounding area of VEAS, there are a business park, residential properties and a recreational area with nature trails.

Before installing a plant handling flammable substances, the plant owner must get approval from DSB. One requirement to obtain this approval is performing a Qualitative Risk Analysis (QRA). The QRA shall establish risk contours that define an inner, a middle and an outer risk zone for the plant. The inner zone should be limited to the plant’s area and inside its fences, while the middle and outer zone define areas around the plant with limitations on activities and habitation.

An early phase risk assessment had been established for the planned LBG plant. In this assessment, they were using simple 2D empirical tools that do not account for 3D effects of terrain and buildings. This approach resulted in risk zones covering a large circular area around the LBG plant in conflict with existing activities and habitation in the neighbourhood.
By combining frequencies for accidental releases calculated by the risk analysis with actual weather conditions on the site and CFD simulations of LBG releases using FLACS, 3D risk contours could be calculated and presented in the 3D terrain and LBG plant geometry model established for VEAS.

**Conclusion**

As a result, nearby residential areas were found to be unaffected by the new risk zones introduced by the planned LBG plant, since houses are located at higher elevations and are shielded from the new plant by a hill between the plant and the residential area. This finding would not have been possible without the use of CFD and a detailed 3D terrain model.

The full QRA for the LBG plant is publicly available from [DSB's web-pages](#).
About Gexcon
Gexcon is a world-leading company in the field of safety and risk management and advanced dispersion, explosion and fire modelling. Our experience arises from detailed knowledge of explosion and fire phenomena built up for more than 40 years of performing extensive research projects, carrying out safety assessments, performing accident investigations and performing physical testing at the company’s facilities.

For more information and product enquiries.
Website: www.gexcon.com
Email: flacs@gexcon.com

References

Author
Øystein Spangelo
Principal Engineer