# 9th IWA Odour & VOC/Air Emission Conference
# 26-27 October 2021 Bilbao, Spain

## ABSTRACT

## $H_2S$ ODOUR MANAGEMENT IN A SEWER PUMPING WELL THROUGH AIR QUALITY MEASUREMENT AND DISPERSION MODELLING

Andreas Luckert[a], Carlos Lafita López[b], Daniel Aguado García[c]
Rafael García Bartual[d], Norbert Frank[a], Fernando Andrés Tomás[b], Mauro Orts Zamorano[b]

[a]Institute of Environmental Physics, Ruprecht-Karls University Heidelberg, Germany.
[b]I+D+i Global Omnium, Gran Vía del Marqués del Túria, 19, 46005 València, Spain.
[c]CALAGUA, Unidad Mixta UV-UPV, Institut Universitari d'Investigació d'Enginyeria de l'Aigua i Medi Ambient (IIAMA), Universitat Politècnica de València, Camí de Vera s/n, 46022, Valencia, Spain.
[d]Institut Universitari d'Investigació d'Enginyeria de l'Aigua i Medi Ambient (IIAMA), Universitat Politècnica de València, Camí de Vera s/n, 46022, Valencia, Spain.

$H_2S$ generated in sewers is of major concern for several reasons: its release to the atmosphere (in waste-waterfalls, manholes and pumping wells) can cause odour nuisance to nearby residential areas, it causes corrosion in sewer networks (a critical infrastructure) and can be a serious risk for workers' health.

In this work, air quality measurements of $H_2S$ emissions from a pumping well located in a touristic town (in a region with high sulphate concentration in drinking water in the east coast of Spain), together with on-site olfactometry and dispersion modelling were used to assess the odour impact in the nearby residential area and to propose management strategies.

Originally, the upper part of the circular pumping well (2.3 metres diameter) was open to the atmosphere through a tramex-type grid. Despite that $H_2S$ is denser than air, its concentration in the upper part of the well reached noticeable concentrations (95th percentile around 13 ppm) and olfactometry measurements outside the well with values up to 8.3 $OU_E/m^3$ confirmed the risk of odour nuisance in the surroundings.

Detailed temporal pattern analysis of the key variables involved (wind speed, wind direction and $H_2S$ concentration) revealed that the probability of the closest area with risk of odour nuisance to inhabitants (parking lot, restaurants and residential area) was highest from June to August in the evening. To delimit of the area potentially affected with $H_2S$ concentrations above the perception threshold, a conservative Gaussian dispersion model (AERMOD) was used to map the $H_2S$ concentration in the pumping well surroundings.

Afterwards, the emission source was completely sealed with plastic plates, and the $H_2S$ concentration measured inside the pumping well (in the upper part) and outside. The concentration inside rose significantly (30$^{th}$ percentile around 20 ppm), which needs to be considered when opening the well for maintenance works, and for the risk of accelerated corrosion of the existing infrastructure. The measurements outside the pumping well were below the detection limit of the sensor and the outer olfactometry measurements corroborated that no perceptible odour could be smelled after sealing.

It was concluded that the odour emissions from the pumping well integrated into the urban environment can led to odour nuisance in the neighbourhood. Dispersion modelling is a useful tool for assessment and management of odour emissions.

To avoid accumulation inside the well, it is necessary to equip the pumping well with a gas phase odour treatment like biofiltration or activated carbon adsorption.

Indicate preference of kind of presentation

- ☐ Oral Communication
- ☒ Poster

Indicate topic of your work for the conference:

- ☐ Policy and associated regulations for odour and air quality.
- ☐ Odour/VOC measurement, monitoring&sensor technologies.
- ☐ Odour/VOC perception, impact, formation and dispersion.
- ☐ GHG emissions particulate matter and industrial emissions.
- ☐ Source characterization and odour/VOC mapping.
- ☐ Odour/VOC abatement, mitigation and neutralization.
- ☒ Odour/VOC from waste water, sewer systems and livestock.
- ☐ Air emissions and sustainable solutions for waste handling
- ☐ Community engagement, social media and citizen action.
- ☐ Other (suggest a new topic):

The scientific committee can examine the kind of presentation and session where authors propose to include their works.