Summary Model: Submit before December 15th to:
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ABSTRACT

TOP-DOWN STRATEGY: TECHNOLOGY AND BIG DATA FOR AN ODOR-CONTROL MASTER PLAN

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Odorant-gas mitigation strategies have been performed through a “bottom-up” technology for long. It usually begins by a plant diagnosis, performed through combining odor-emission-rate-analysis with meteorology and topography parameters in a simulation system. This allows the assessment of the odorant impact in neighboring communities. This in turn allows for the suggestion of odor mitigation strategies and their implied cost-benefit ratio. Although this is a good starting point, it relies on two wrong assumptions: a) the facility’s emission will remain constant in time —when in fact they vary within production cycles— and b) all communities are equally sensitive to the different emission, ignoring the fact that wind speed and direction, temperature, humidity, and the distance from the emission source to each inhabitant will influence their smell perception.

This article summarizes lessons learned during the implementation of a real-time continuous monitoring system in a cellulose production plant in Chile. It relies on technologies such as artificial intelligence, IoT devices such as gas monitoring systems (IMOS) —hereafter “SmartSense®”— and online impact plume model, hereafter “SmartPlume®”. Ambient air data collected in real time —such as gas emissions and meteorological information— allowed to carry out an extensive Big Data analysis and searched for correlations with complaints received from the community. The main findings allowed the plant to associate:

1. Gas type and concentration (ppm) with complaints from the community.
2. Production areas most involved in community complaints.
3. Sensitivity level of neighboring communities and adequate situation management.
4. Times of the day and weather conditions that are most critical for the community.

This understanding yielded three major plant improvements:

1. **Continuous improvement plan** based on the greatest community-impact areas, as well as contingency plans for emergency situations.
2. **Minimize possible “future” impacts on the communities** through instant alerts systems via email and SMS to operators —in the event of an increase in gas concentration levels— in order to take quick and efficient corrective actions.
3. **Cost reduction in its odor neutralization systems** by focusing efforts on the most critical points, and discontinuing or reducing efforts in those with less impact.

Conclusion: The integration of different technologies has brought key information to the plant operators. This in turn allowed the implementation of a top-down operational control strategy that translated into a risk matrix that enables an efficient master plan for the reduction of odorant nuisances. Today, continuous monitoring through SmartSense® and SmartPlume® has become an essential part of the plant ecosystem. The information provided — interconnected with artificial intelligence in the cloud— has allowed the model to analyze and optimize the system on an ongoing basis. This brings more accurate data to operators, generates cost savings in the automatically controlled neutralization system, and reduces inconveniences to the community, among others. This highly effective system for operational control has brought evident benefits for the industry and the community at large.

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 may change the session where authors propose to include their works.