WASTE RECOVERY PLANTS AND ODOUR CONTROL

A CASE STUDY FROM ARPA FRIULI VENEZIA GIULIA ON THE IMPACT OF AN ORGANIC WASTE-TO-ENERGY BIOGAS PLANT: MONITORING PLAN, USE OF AN ELECTRONIC NOSE, DIFFICULTIES IN SPOTTING SOURCES OF ODOUR NUISANCES.

The term *environmental control*, in its widest definition adopted by the European Parliament and the European Council 2001/331/EC, includes both control activities on pressure sources but also the monitoring of environmental matrixes.
The crossing between environment agencies control activities and impact monitoring planning organized by companies in order to comply with authorizations, results in a virtuous circle aimed at strengthening the legal compliance with environmental rules and regulations by business operators in order to better protect communities.
Here follows what happened in Friuli Venezia Giulia region in a biogas plant located in Maniago, in the province of Pordenone.
The plant, fed with separate collected waste treated through composting, bio-stabilizing and anaerobic digestion, was considered as the cause of bad smell in the whole area. After several reports by the locals about odour nuisances, the municipality decided to check the situation and asked for the technical support of Arpa Friuli Venezia Giulia.
The company had previously assessed the level of odour emissions during the environmental impact study by making estimates through odour dispersion simulation models. Environmental compatibility rules included an emission-monitoring plan through *ante operam* and *post operam* measures to be taken with the operating plant.
In particular, the concentration level of a number of compounds had to be measured with passive samplers, namely ammonia, limonene, hydrogen sulphide, mercaptans, as well as odours through an electronic nose.
The measuring points were located along the borders of the plant area and sampling was made for one week every two or three months, according to the parameter. The detected values, both for compounds and odours, seemed to indicate that the plant was not the cause of the odour nuisances.

Arpa Friuli Venezia Giulia, which has a procedure to be applied in case of odour nuisances reported by the citizens, adapted its method to this specific case that was made even more complex by the nearby presence of other similar odour-releasing sources. The Agency wanted to quantify the level of odour nuisance, compare it with the simulated impact, identify possible causes, assess possible measures and update the monitoring plan.
First of all, an impact assessment was made by giving questionnaires to the receptors, i.e. the people suffering from the impact. At the same time, the plant managers filled accurate logbooks in order to trace all the single sub-processes generating the odours reported by the receptors. The outcome of the data analysis done in order to quantify the level of perceived discomfort showed higher results compared with those calculated in the preliminary impact study. However, the presence of several similar sources did not allow a clear distinction of the specific level of contribution to the overall impact. That is why electronic noses were specifically located and set.
Further analysis showed that an update of the composting monitoring plan was needed in order to make it more accurate. Also the use of the electronic nose will have to be modified in order to find the closest measuring point to the most affected receptors and to the plant. Moreover, measuring activities will have to consider the typical daily and weekly odour patterns highlighted by the questionnaires.
In particular, metadata monitoring (information on the specific sub-processes occurring while the odour nuisance was most perceived, weather conditions, extemporary activities in the affected area, etc.) had to be carried out in conjunction with the electronic nose sampling.
Not only the new monitoring plan will also have to include frequent and regular controls on the maintenance and cleaning of the used vehicles, because they could also be a possible cause for bad smell, but it will also need to be integrated with the monitoring plans of the other odour-generating plants located in the same area. Considering such a context, Arpa Friuli Venezia Giulia may be asked to provide technical support in setting the electronic noses with the samples coming from the other plants.

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