



Overlast van een mengvoederbedrijf

Onderzoek naar mogelijke geuroverlast en gezondheidsrisico's door stofemissies voor omwonenden van firma De Heus in Ravenstein

Nasal cavity

Tongue

Larynx

Sander Essers
Peter Hofschreuder

Nasopharynx

Oropharynx

Laryngopharynx
(hypopharynx)

Oesophagus
(gullet)

December 2007

Rapport 241

Summary

An animal feed mill and transshipment company is located next to the centre of the small town Ravenstein, in the province of Noord Brabant, the Netherlands. Inhabitants of the town regularly experience trouble by smell and dust from the mill, and worry about possible negative health effects. In order to enable a projected more than doubling of the production capacity, the company has submitted a request for obtaining an environmental licence to produce this quantity. She also requests the possibility to process primary materials such as blood, animal and fish meal, and antibiotics. These components can – carried by the wind – spread into the environment and thus possibly form a health risk for the people in the neighbourhood. Inhabitants fear increase of the nuisance by odorous components; they have protested officially at the High Court and seek clarity about the possible health risks and underpinning of their complaints on stench.

The present study, performed in commission of Stichting Belangengroep Stad Ravenstein (Interest group Town Ravenstein), focuses on discomfort from smell and on the possible health risks from the dust emissions.

With the help of the model STACKS 6.2 (update 2007), the particulate matter (PM10) and odour emissions have been calculated again, as it had been done previously in command of the company by two different consultancy firms. At the time of the writing of the report, it was understood that the company considers to increase the chimney height from 38 to 55 meters above ground level. This alternative scenario has been included in the calculations. By expert consultation at IRAS, the Commodity Board for Animal Feed and the Public Health Service, and by literature search, the possible health effects have been studied from inhalation of particulate matter, antibiotics, mycotoxins, endotoxins, and blood-, animal- and fish meal.

Inhalation of PM10 can be hazardous for health. The consequences are mainly disorders of airways and lungs, and damage to the heart function. No lower limit can be given below which no health effect may occur. The European directives – less strict than the health-based WHO recommendations – are a maximum year averaged concentration of PM10 of $40 \mu\text{g m}^{-3}$ and a maximum day average of $50 \mu\text{g m}^{-3}$ which is not to be exceeded more than 35 times a year ($\pm 90^{\text{th}}$ percentile). At lower concentrations, the adverse effects on health are gradually diminishing and below $40 \mu\text{g m}^{-3}$ the effects seem slight.

To assess the exposure of the inhabitants of Ravenstein to PM10, two scenarios have been calculated, considering the production of 325.000 metric tons per year with a share of 200.000 metric tons of compound feed, with a chimney height of 38 and 55 meter, respectively. The contribution of the mill to the year mean concentration of PM10 is not more than a few micrograms or a few tens of micrograms per cubic meter, respectively. The local background concentration is estimated to be $28 \mu\text{g m}^{-3}$. This means that the EU air quality standard for the year averaged PM10 concentration of $40 \mu\text{g m}^{-3}$ is not exceeded.

A second check is the EU standard for the day averaged concentration of $50 \mu\text{g m}^{-3}$. This one may be exceeded maximally 35 times a year. In other words, the 90 percentile of the concentrations is not to be higher than $50 \mu\text{g m}^{-3}$. It appears that the 90 percentile is considerably higher than $50 \mu\text{g m}^{-3}$, but the contribution of the mill to this only counts a few micrograms per cubic meter. The general background for the 90 percentile is already about $69 \mu\text{g m}^{-3}$. With a chimney height of 55 m, the value for the 90 percentile decreases slightly, but not below $69 \mu\text{g m}^{-3}$, or $65 \mu\text{g m}^{-3}$ after correction for the local concentration of sea salt. Apparently, Ravenstein already has an air quality problem that is slightly enhanced by the mill.

The mill's contribution to the exceeding of the day averaged concentration is small and will further diminish with an increased chimney height. A chimney height of 55 m instead of 38 m lowers the mill's contribution to the dust concentration by a factor 3. This could be important if the mill's specific emission of noxious components would imply health problems.

No indications have been found in literature that inhalation of meal from blood, fish or other animals, nor of antibiotics, at these levels will have a harmful effect on the public health. As the concentration of most potentially harmful components is unknown, it is often not possible to estimate the risks for the people in the neighbourhood. For endotoxines, however, this was possible and it has been calculated that the exposure does not come close to a health based threshold level. Such an estimate could not be made for mycotoxins because of the lack of health based threshold levels for their inhalation. Considering the low contribution of dust from the mill to the

dust concentration levels Ravenstein, the presumable small part of the total processing capacity consisting of meal from blood, fish or other animals, the present minimal use and direct risk of antibiotics, it is not probable that the potentially hazardous components will constitute a relevant health risk for the inhabitants of the town Ravenstein. Establishing hard proof for this, however, lies beyond the scope of this limited study.

The odour concentrations, as a result of emissions from the press lines of De Heus' feed in Ravenstein exceed the by the Noord Brabant province established limit of 3.8 OU m^{-3} for the 98 percentile (7 days per year) in part of the town centre.

This upper limit is a factor 2 less strict than indicated in the Noord Brabant province established touchstone. The exposure of the buildings close to the mill reaches the upper limit (6 OU m^{-3}) of the test frame. Comparing the test frame of the Noord Brabant province with that of the province of Gelderland shows that Gelderland checks more rigorously than Noord Brabant does. Compared with the guide value that is used in practice, Gelderland tests 2.5 times stricter. The limit in the NeR (Netherlands emission Guidelines) of 1 OU m^{-3} is even stricter.

Increasing the chimney's height from 38 to 55 m reduces the odour nuisance to below the guiding value set by Noord Brabant province for the 98 percentile (but not below the NeR level) at the requested production volume of 200,000 metric tons press product per year. Even with a chimney height of 55 m, all guiding values would be exceeded if the production of press product would be increased to 325,000 tons per year.