

Fred Koch, Hannover

# Evaluation of Cattle Stalls in Building Permit Applications and Development Plans

## The Procedure in Lower Saxony

*For the first time, the revised Article Act from August 2001 (which includes the revision of the Federal Immission and Ambient Pollution Control Act and the Technical Regulations Concerning Air Pollution) requires the mandatory measurement and evaluation of immissions from cattle stalls, which will influence both farmers' construction projects and the planning of residential construction by rural municipalities at the federal level. The imminent implementation of these new regulations raises a wide range of questions for approval- and technical authorities in their daily work, which comprise the scope, the real danger potential, proportionality, and many other concerns.*

Dipl.-Ing. (arch.) Fred Koch is head of the department „Construction and Technology“ of the Chamber of Agriculture Hannover, Johannsenstr. 10, 30159 Hannover; e-mail: koch.fred@lawikhan.de

### Keywords

Development plans, building permit application, environmental protection

In some federal states, comprehensive evaluation standards had already been introduced before the revision of the Article Act, which allowed agricultural emissions and the resulting immissions to be quantified according to permissible pollution frequencies from the industrial sector. The so-called Odour Immission Directive (GIRL), which has been effective for trial in Lower Saxony since 1996 and has been a mandatory regulation for administrative use since 2000, has already defined emission sources with a temporal limitation of the permissible duration of immission which had not been listed in any directive up to that point. As a result, cattle houses and the structures which belong to them were mandatorily subject to the construction-legal and, hence, fundamental requirements of the Federal Immission and Ambient Pollution Control Act, which stipulates that harmful environmental impacts must be avoided and kept to a minimum.

### The Administrative and Approval Practice in the Past

In building permit procedures, buildings and structures for cattle housing were considered unproblematic with regard to immissions until the beginning of the nineties.

Even though the neighbouring residential population occasionally complained about

- flies or
- nuisance caused by odour due to dung stores, spoilt silage or beet leaves and
- the noise of milking systems, the rattling of feeding barriers, or the roaring of animals, cattle stalls and the nuisance caused by them were generally accepted as locally usual and tolerable. Thus, the complaints were mainly based on malfunctions, changes in technology and operation, or the obviously very small distances from buildings close to the border.

In a development plan, the principle of mutual consideration has so far always been considered fulfilled if

- a radial distance of 50 m from cattle stalls was kept within mixed village areas (MA) and

- a distance of 100 m was kept from general residential areas (RA).

In building permits, these distances were specified more precisely through conditions. Thus, the cubicle house for 80 cows and their offspring, which was built in large numbers in Northern Germany, was granted approval for construction closer to residential buildings if the distance from intensive emission sources, such as slurry unloading shafts or storage containers, at least met the previously mentioned distance regulations.

Independent of the farm size, numerous plans for village development or -renovation were based on these orientation values. It was even assumed that these generous regulations still provided sufficient leeway for the „ability of agricultural operations to develop, which requires prime consideration“ according to section 5 of the Building Utilization Decree.

In 1994, the Bavarian State Ministry's publication „Odour Emissions from Cattle Houses“ (yellow brochure number 52) came out, which was based on a study by Zeisig/Langenegger of Weihenstephan University. Its simplified core evaluation, which resulted from numerous inspections of a wide variety of cattle stalls, stated that only in rare cases could odour plumes from cattle stalls be perceived beyond a distance of 30 m.

In the year 1994, the VDI guideline 3473 „Emission Reduction – Animal Housing Cattle“ was widely disseminated as a draft. The fundamentals of emission differentiation and -estimation contained in this guideline were plausible to many approval authorities and able to be applied in practice. Even though the VDI guideline commission withdrew this draft in the same year with the recommendation not to use this paper even for trial, it was nonetheless employed by authorities and administrative courts because other bases for assessment were not available. The evaluation contained in the guideline, according to which farms below the irrelevance threshold of 15 odour-equivalent LU (equivalent to pig houses), i.e. approximately 55 cows with female offspring, cause

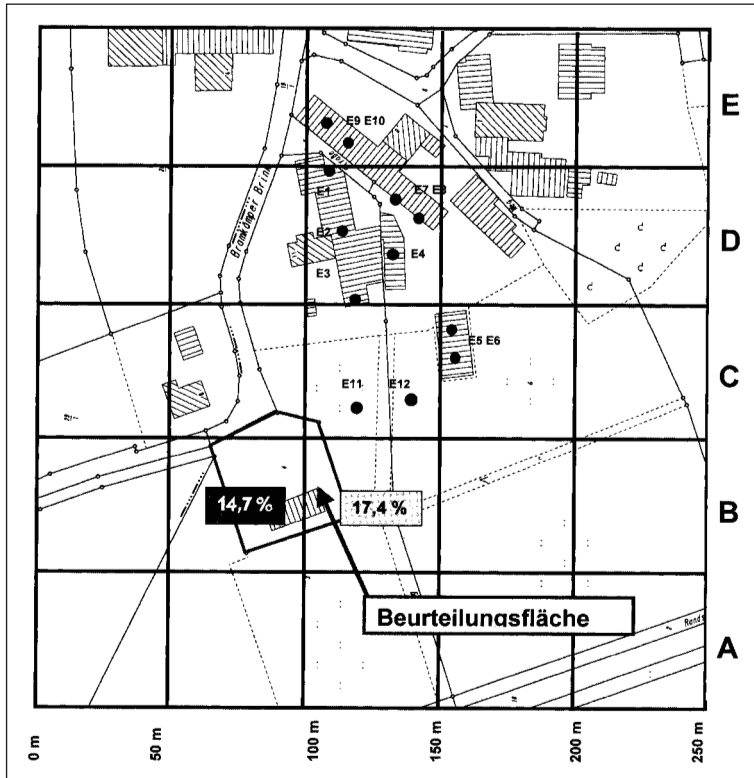


Fig. 1: Example of presenting a dissemination calculation with GIRL (odour immission guideline)

virtually no immission and are only to be assessed taking into special consideration the suitability for approval, was plausible as well.

The odour equivalence values of this VDI guideline and the measurement of odour concentration in different stalls by experts and universities, whose results were also published in the relevant KTBL publications (260, 333), also exhibit approximate conformity. Equivalence refers to the generally recognized VDI guideline 3471 (Emission Reduction – Animal Housing Pigs). Thus far, these odour values have enabled a consistent, credible basis for evaluation to be deduced, which in nuce shows a mode of proceeding that has proven itself in the practice of approval in Lower Saxony.

Accordingly, the following regulation was generally used by licensing authorities for both cattle stall construction projects and approaching residential buildings:

Minimum distances between residential buildings and cattle stalls

- a) at a herd size below the irrelevance threshold of 15 LU<sub>eq</sub>
  - from mixed areas (MA): 30 m
  - according to VDI guideline 3471, a 100% safety factor is required, i.e.
  - distance from residential areas (RA): 60 m

b) at a herd size below the irrelevance threshold

Step 1: alternative application of VDI guideline 3473 (cattle guideline) as assessment for the worst case. However, the distance values in this guideline are generally so large that on the one hand they can only be realized at outlying locations while on the other hand they do not correspond with real perception.

Step 2 (regular case): evaluation according to the Odour Immission Guideline (GIRL) with a diffusion calculation and a map of the potential odour frequencies in the environment of the livestock farm. This also allows cumulating or neighbouring sources to be integrated.

A diffusion model enables average annual odour perceptions to be calculated using the aid of meteorological diffusion class statistics. Each individual source must be defined in detail with regard to its position in the system of coordinates, its topographical altitude, the species and number of animals, the housing technique, ventilation technology, exhaust air conduction, odour concentration, etc.

The mean percentage values shown in the grid serve as an evaluation criterion of tolerable permissibility depending upon the character of the area. According to the Introduc-

tion Decree, odour frequencies of 20% are tolerable in residential areas at agriculturally oriented locations or in outlying areas, whereas immission frequencies in RA-areas must be limited to 10%.

### Progressing Problems Must Be Expected

Every stall becomes an obstacle to housing developments, and each residential house impedes the alteration of stall facilities. The revision of the Federal Immission and Ambient Pollution Control Act, which coincided with the beginning of the BSE crisis in Germany, resulted in additional political pressure and simplified the introduction of stricter approval conditions and obligations.

In order to apply the legal requirements in conformity with the equality principle of the constitution, all developments in construction planning are now rendered impossible, especially in agriculturally oriented areas with a large number of existing animal housing facilities.

If the distance regulations of the Technical Regulations Concerning Air Pollution are applied literally, only stall locations far away from residential areas and nature worth protecting (i.e. absolutely remote locations) will get approved. Today, it is already difficult enough to find a location which meets these requirements, especially in small-structured landscapes.

In addition, initial draft amendments to the Federal Construction Act show tendencies towards farther-reaching restrictions which exclusively apply to agricultural construction projects. The abolition of the privileges for agricultural operations with regard to construction in outlying areas according to section 35 of the Federal Construction Act, and the reservation of special areas for agriculture, would entail significant consequences and further intensify the given structural change.

If entire regions are now intended to be kept free of buildings, only large farms, which are location- or area-independent, will be able to develop in the future. Thus, the polarization of very small farms at village locations and large farms in special areas would be preprogrammed. It seems more than doubtful whether the municipalities will give their consent to the reservation of special areas for agriculture in their districts. Given such restrictions, it is to be expected that livestock farming will increasingly be relocated to other countries.