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# BEST AVAILABLE TECHNIQUES IN EUROPEAN LEGISLATION AND THE POSITION OF THE EUROPEAN FERTILIZER INDUSTRY: A FOLLOW-UP

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## *RESUME*

*La directive européenne sur la prévention et le contrôle intégrés de la pollution propose des mesures de grande envergure pour le contrôle de la pollution de l'air, de l'eau et du sol par les industries. Les valeurs des futures émissions autorisées seront basées sur ce qui peut être réalisé au moyen des meilleures techniques disponibles (BAT). La Commission européenne s'est lancée dans un vaste programme établissant un nombre de documents de référence BAT pour fournir aux états membres les informations sur les techniques les plus récentes de prévention et de contrôle de la pollution. La production d'ammoniac et d'acide nitrique a été choisie comme cas pilote. Comme l'EFMA a déjà publié ses propres références BAT pour ces deux procédés, l'EFMA a été invitée à participer aux travaux de la Commission.*

*Cet exposé présente les documents BAT publiés par l'EFMA en 1995 et suggère des améliorations nécessaires à apporter aux documents de référence BAT de la Commission, tant sur le plan de la méthode de travail que sur le contenu. De plus, l'EFMA plaide en faveur d'une plus grande harmonisation du travail avec d'autres organisations, de sorte que la signification des BAT reste la même, que les valeurs d'émissions soient compatibles, et que la manière dont les autorisations environnementales soient établies ne risque pas d'entraîner une concurrence déloyale.*

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## 1. INTRODUCTION

At the IFA Technical Conference in Amman two years ago, you were introduced to the work that the European Fertilizer Manufacturers Association (EFMA) was carrying out to establish a common industry position on best available techniques for pollution prevention and control (1). We are happy to announce that the member companies of EFMA have reached agreement and that 8 booklets were published in 1995. The booklets were the result of a team effort of many technical experts in the industry, and their publication has definitely been a success - at least when judging the number of copies being requested world-wide.

The booklets conclude what we consider Best Available Techniques (BAT) and what are the achievable environmental emission levels and energy consumption figures for the principal fertilizer manufacturing processes in Europe. We have been true to the European Union's definition of BAT: The techniques shall be available for purchase for all operators at a price not entailing excessive costs.

The reason why EFMA has put so much effort into this work is two-fold:

First, we are of the opinion that the industry must address environmental issues seriously and pro-actively. We should participate actively in the formulation of our future regulatory framework. And as you may know, the EU Commission in Brussels and the national member states are very active in environmental legislation. We support this, but at the same time we see that there is a need for simplification and harmonisation across national borders, and that over-regulation in one part of the world may lead to unfair competition. We could even have industries « flagging out » to less regulated regions, and thereby creating a greater threat to our common environment.

Secondly, we want to exchange views and experiences on environmental matters between the industrial companies, so that we could develop a common position. It is obvious that we have a stronger voice when we stand united. However, if we are not keeping to the pro-active intentions, a united *defensive* approach will be not bring us anywhere. You need only to look at opinion polls of people's attitudes to the chemical industry - a defensive approach does not create credibility and trust.

Those of you who still think these booklets are just another set of documents written by the industry to combat regulatory initiatives, are wrong. We support the establishment of the EU Directive on Integrated Pollution Prevention and Control (IPPC), where the principle of using BAT for environmental permitting purposes plays a dominant rote. And in this context we are fully aware that the emission levels and energy consumption figures given in the EFMA BAT-booklets, will represent a major challenge for some plants in Europe.

## 2. EUROPEAN LEGISLATION

It is the intention of the European Union to restructure their environmental regulations in a hierarchical way with a few fundamental important ones on top. The proposed EU Directive on Integrated Pollution Prevention and Control (the IPPC Directive) is one of these (2). It has been around for a number of years and has been widely discussed and redrafted a number of times. Now all parties seem to agree, and it is expected to be finally approved in 1996.

The IPPC Directive proposes far-reaching measures for an integrated approach to the control of air, water and land pollution from industrial plants. When new industries are being built, they will have to introduce the latest technology to reduce emissions, whilst existing plants will have until the year 2006 for cleaning up and to comply with the new Directive.

The new directive is intended to allow for an *integrated* approach in pollution control, rather than tackle each pollutant separately. A permitting procedure is proposed based on admissible levels of pollutants for several industrial sectors, including the fertilizer industry. Emission limit values will be set by the competent authority of each member state, based on Best Available Techniques (BAT).

If a defined environmental quality standard is being met by lower emission requirements than those achievable by the use of BAT, the competent authority may allow more emission than would have resulted from the application of BAT, but only on the condition that:

- only a negligible increase in pollution is likely to result, and
- no contribution to transboundary and/or global pollution is likely to occur.

When no environmental quality standard has been set for a particular substance, emission limit values shall have to be based on BAT.

The member states shall ensure that the competent authority follows or is informed about developments in BAT for preventing or minimising emissions into the environment as a whole. The European Commission is responsible for exchanging information on BAT with the member states. The Commission has embarked upon an ambitious programme of establishing BAT Reference Documents for some 30 industrial sectors in the 5-year period 1996-2000, as shown in Table 1. The fertilizer industry is to be covered in 1998. However, European BAT Reference Documents are under preparation for ammonia production and nitric acid production. The Commission selected these processes as the first ones in order to develop guidelines on how future BATs should be developed and described.

## 3. THE EFMA BAT-BOOKLETS

Let us give a short summary of the contents of the 8 EFMA BAT-booklets:

(1) They cover the production processes for the following products:

Booklet 1: Ammonia
Booklet 2: Nitric acid
Booklet 3: Sulphuric acid
Booklet 4: Phosphoric acid
Booklet 5: Urea and UAN
Booklet 6: AN and CAN
Booklet 7: NPKs by the nitrophosphate technology
Booklet 8: NPKs by the mixed acid route.

(2) They describe the production processes in operation today and what we consider to be the best technologies for minimising emissions, but taking due account of what is feasible cost-wise and whether the technology is available for the industry in general.

(3) They give achievable emission levels to air and water and the quantity of wastes. In our opinion these levels should be the basis for future operational permits being issued by the local environmental authorities. Some of the booklets, and in particular the one on ammonia production, also include achievable minimum energy consumption figures. Production processes operating above these levels would in our opinion not qualify for the term Best Available in the future.

(4) The emission levels given in the booklets have, to some degree, been considered from an *integrated*, meaning that we have concluded the best *balance* between emissions, wastes and energy consumption. It is clear that a reduction of one emission may give an increase in another or a higher energy consumption. We have made our best judgement on how to take account of this integrated approach, which the regulators claim should be given priority in future permitting. We are, however, aware that local environmental conditions may require a different balance and focus, which need to be reflected in the operational permit. We strongly recommend that guidelines are prepared by the EU Commission on how to assess the relative importance of the different emissions, ranging from issues of global impacts to those that may only represent a local disturbance, between marine and air pollution, noise and visual impacts, etc.

(5) The booklets give two sets of BAT emission levels: One for modern plants or new constructions and another for plants that have been in operation for some time (say built before 1990). The principal reasoning for giving two sets of emission figures is that for new plants modern prevention technology can be readily integrated into the process design (and less emissions can be obtained in a cost-efficient manner), whilst for existing plants emission reductions can only be done by installing end-of-pipe technologies or through costly process revamps.

(6) We said above that these emission levels ought to be the basis for future environmental permits. We need to qualify this a little: The levels should be used as *reference* levels or yardsticks for what can be achieved. In setting the final permit, deviations should be allowed in case of the following:

   a) if the environment can sustain the higher emissions, without negative effects locally, inter-regionally, nor globally;

   b) if the social costs of requiring BAT is too high;

   c) if the size of the production process, the availability of energy sources and raw materials, or the product range being manufactured, are different from what is assumed in the booklets.

(7) We also make a recommendation to introduce the *bubble* concept when setting permits, i.e. not to define limits for each and every emission point in the factory, but to consider the whole industrial site as one source of emissions. By this plant management will more readily take ownership of the environmental issues: They will have more options for pollution prevention to consider, they will have the opportunity to select the more cost-effective ways for pollution prevention, and this will better enable them to integrate improvements in the environmental sector with other improvement activities on the site (continuous improvements need careful planning and long term commitment). And probably most importantly, this will make industry more knowledgeable on environmental matters within their individual specific fields of operation. And we know that knowledge is the key to success.

Table 2 presents an overview of the achievable emission levels given in the EFMA BAT-booklets. The booklets are available by contacting EFMA's secretariat in Brussels (EFMA, Avenue E. Van Nieuwenhuyse 4, B-1160 Brussels, Belgium; Phone +32-2-6753550; Fax +32-2-6753961).

EFMA had informal consultations with EU's Environment Directorate (DG XI) throughout the two years it took to produce the BAT-booklets. Their reactions to our approach were positive and we were praised for our initiative.

## 4. REMAINING DIFFICULTIES

The success of the IPPC Directive depends on a common understanding and agreement on what is BAT. This can best be achieved through a co-operative work between the Commission, member states and the industry. The process should also allow for comments from non-governmental organisations to be taken into consideration. The Commission has defined a procedure for such a constructive co-operation and they are using their research centre in Seville as a moderator for developing BAT Reference Documents.

As mentioned, BAT Reference Documents are now in preparation for ammonia production and nitric acid production, as test cases. EFMA has been invited to participate in that work. After more than a year's involvement we have some concerns about the process and the working procedures adopted, and which we have expressed to the Commission. Our main concerns are the following:

(1) *The process of developing BAT Reference Documents is time consuming and complex.* For the ammonia BAT Reference Document numerous meetings and consultations between industry and national authorities have been held, and many people have been involved. We think it would be better to select a few experts, including industry representatives, to work on draft documents and suggesting emission levels that should be considered to represent BAT. The Reference Document should be short and target-oriented, as discussed below.

(2) *For some regulatory authorities the meaning of the words "Best Available Techniques" is the same as « The Best Technology ».* Instead of providing detailed technical descriptions, the BAT Reference Documents should give only the principal features of what can be considered as BAT and define a list of BAT emission levels. In our opinion all techniques, whether they are mentioned in the Reference Document or not, which satisfy these levels should be accepted as BAT. By such a target-driven approach (using specified limits) rather than a prescriptive approach (using detailed defined techniques), the scene is set for more innovative research and development, perhaps which will create completely new techniques which are more cost-efficient than the methods we know today. We fear that the prescriptive approach will be create less incentives for such innovations.

We can mention the proposal (3) made by the Baltic Marine Environment Protection Commission (HELCOM) as a preferred example of how to use the term BAT for regulatory purposes - short and target-driven (although we might not agree with the numbers they have given).

(3) *It is difficult to derive at meaningful generalised cost estimates for pollution prevention and control techniques.* Costs which can be computed based on experience from local sites, cannot simply be transformed into generally applicable figures for the whole of Europe. The site specific differences can be large, not least to mention the difference is size, the degree of integration between various process units, and the environmental constraints encountered. Hence, cost-benefit considerations must, and should, be taken care of at the local level, and not based on generalised assessments. We encourage the Commission to establish a guideline for local cost-benefit assessments rather than developing a data bank on equipment costs, etc. (which might not have any relevance for the local site).

(4) *Emission levels are stated without reference to the method of analysis.* It is apparent that across Europe a wide variety of analytical techniques are being applied when measuring the level or concentration of emissions. This is an area in need of European harmonisation, and especially so for the correct use of the BAT Reference Documents.

(5) *No difference is made between older units and new plants.* In older plants end-of-pipe treatment is in most cases the only cost-efficient solution, whilst for new plants pollution abatement can be readily integrated into the design of the processes. This distinction is important when issuing environmental permits, since most plants are constructed to last for many years and will still have a valuable life also after year 2006 when the IPPC Directive takes effect for the present existing plants.

## 5. OTHER DIFFICULTIES

We notice that the term BAT has been introduced in the text of several national regulations and by many international governmental and non-governmental commissions and organisations. Since the term is generally meant to mean the same (we hope), why not agree on a common definition? Furthermore, there seems to be a « competition » in establishing BAT emission limits, giving rise to wide discrepancies. We would suggest that all parties take time to harmonise their efforts.

Let us specifically mention the Industrial Pollution Prevention & Abatement Handbook issued as a preliminary draft by the World Bank in collaboration with the United Nations (4). The handbook refers to a number of achievable emission levels for the fertilizer industry, much in the same spirit as the EFMA BAT-booklets. The emission levels, however, vary quite considerably from those given in the EFMA booklets. We find this confusing, and we find it strange that advice of technical experts in the European fertilizer industry has not been used.

## 6. WHAT NOW?

The whole European fertilizer industry is behind the EFMA BAT-booklets. We will continue to argue that the levels we have quoted, are representative of Best Available Techniques. And we will insist on getting involved - we take our Responsible Care seriously.

## REFERENCES

(1) Tore K. Jenssen, Hydro Agri Europe: « "EFMA Task Force on Best Available Techniques for Pollution Prevention and Control in the Fertilizer Industry », 1994 IFA Technical Conference.

(2) Official Journal of the European Community No. C 87/8: « Common Position (EC) No 9/96 adopted by the Council on 27 November 1995 with a view to adopting Council Directive 96/.../EC concerning integrated pollution prevention and control », 25 March 1996.

(3) Baltic Marine Environment Protection Commission: « Revised Proposal for a Draft HELCOM Recommendation concerning Best Available Technology for the Production of Fertilizers », 2 May 1995.

(4) The World Bank: « Industrial Pollution Prevention & Abatement Handbook », Preliminary version July 1995.

Table 1: The EU Commmission working programme for establishing BAT Reference Documents

| Year | Sector |
|---|---|
| 1996 | Primary/secondary steel |
| | Cement |
| | Paper/pulp |
| | Common: Vacuum/cooling systems |
| 1997 | Refineries |
| | Primary non-ferrous metals (incl. aluminium) |
| | Secondary non-ferrous metals |
| | Surface treatment |
| | Gaseous inorganic chemicals |
| | Textile |
| | Tanneries |
| 1998 | Ferrous metals processing |
| | Glass |
| | Basic organic chemicals |
| | Fertilizers |
| | Chloralkali |
| | Batch organic chemicals |
| | Intensive livestock farming |
| 1999 | Coal liquefaction |
| | Asbestos |
| | Ceramics |
| | Inorganic chemicals: Acids/bases |
| | Hazardous waste incineraiton |
| | Slaughterhouses/animal carcases |
| | Food and milk |
| | Common: Emissions from storage |
| 2000 | Large combustion plant |
| | Other inorganics |
| | Municipal waste incineration |
| | Municipal waste processing |
| | Landfills |
| | Solvent sectors |

Table 2: Achievable Emission Levels for the European Fertilizer Industry
(from the EFMA BAT Booklets 1995)

(Numbers not in brackets = for new plants; inside brackets = for existing plants)

| Production process | Type of emission | ppmv | mg/Nm³ | mg/l | kg/t of product |
|---|---|---|---|---|---|
| Ammonia | $NO_X$ to air | 75 (150) | 150 (300) | | 0.45 (0.9) |
| | $SO_2$ to air | as for combustion plants | | | |
| | $NH_3$ to water | | | | 0.1 (0.1) |
| | Spent catalysts | | | | 0.2 (0.2) |
| | Energy consumption: 32.5 GJ/t $NH_3$ (for new reforming plants) | | | | |
| Nitric acid | $NO_X$ to air | 150 (400) | 300 (800) | | 1.6 (4.2) (of 100%) |
| Sulphuric acid | $SO_2$ to air | | | | 2-4 (10) |
| | $SO_3$ to air | | | | 0.15 (0.6) |
| Phosphoric acid | Fluoride to air | | 5 (30) | | 0.04 (of $P_2O_5$) |
| | Dust/particulates | | 50 (150) | | |
| | Gypsum re-use or disposal on land (for existing plants gypsum disposal to water may continue if accepted by Environmental Quality Standards) | | | | |
| Urea | Granulator Urea dust | | 50 (80) | | 0.25 (0.4) |
| | $NH_3$ to air | 75 (250) | 50 (165) | | 0.25 (0.83) |
| | Prill tower Urea dust | | 50 (150) | | 0.5 (1.5) |
| | $NH_3$ to air | 75 (150) | 50 (100) | | 0.5 (1.0) |
| | Vents $NH_3$ to air | | | | 0.06 (0.75) |
| | Urea to water | | | 1 (150) | 0.0005 (0.1) |
| | $NH_3$ to water | | | 5 (150) | 0.0025 (0.1) |
| Ammonium nitrate | Granulator/prill tower | | | | total to air |
| | Particulates | | 15 (15) | | particulates: 0.5 (0.5) |
| | $NH_3$ to air | | 10 (10) | | $NH_3$: 0.2 (0.2) |
| | Neutraliser/cooler/drier | | | | |
| | Particulates | | 30 (30) | | |
| | $NH_3$ to air | | 50 (50) | | |
| | With insol. solids/ CAN | | | | |
| | Particulates | | 50 (50) | | |
| | $NH_3$ to air | | 50 (50) | | |
| | N to water | | | 100 (100) | 0.2 (0.2) |
| NPK, nitrophosphates | $NH_3$ to air | | 50 (250) | | 0.3 (1) |
| | $NO_X$ to air ($NO_2$) | | 500 (500) | | 0.2 (0.2) |
| | Fluoride to air | | 5 (5) | | 0.02 (0.02) |
| | Dust | | 50 (50) | | 0.3 (0.3) |
| | $P_2O_5$ to water | | | 30 (28) | 0.06 (0.11) |
| | $NH_4$-N to water | | | 60 (120) | 0.12 (0.5) |
| | $NO_3$-N to water | | | 15 (150) | 0.03 (0.3) |
| | Fluoride to water | | | 26 (13) | 0.05 (0.05) |
| NPK, mixed acids | $NH_3$ to air | | 50 (50) | | 0.2 (0.2) |
| | $NO_X$ to air ($NO_2$) | | 70 (70) | | 0.3 (0.3) |
| | Fluoride to air | | 5 (5) | | 0.02 (0.02) |
| | Dust | | 50 (50) | | 0.2 (0.2) |
| | N to water | | | 0 (100) | 0 (0.2) |