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To
EU Commission
Enterprise directorate general

Comments from Norsk Hydro on the proposed EU regulations on cadmium in mineral fertilizers

Please find enclosed comments from Hydro Agri, the fertilizer division of Norsk Hydro, to the proposed EU regulations on cadmium in mineral fertilizers. Hydro Agri is a major global supplier of plant nutrients, with fertilizer production units mainly based in Europe (Norway, Sweden, France, the Netherlands, Germany, Italy) and with sales and distribution in more than 120 countries worldwide. Hydro Agri has more than 7000 employees.

Hydro Agri supports the comments submitted by EFMA, that restricting the cadmium content in mineral fertilizers to levels below 60 mg per kg P_2O_5 is

- not scientifically founded from a health and environmental viewpoint;
- not feasible from a technical point of view since no viable cadmium removal technology is foreseen at reasonable cost;
- not sustainable from a European farming point of view, due to the excessive additional cost to farmers, for which no coverage is provided due to the globalisation of the agricultural market.

Further comments to these issues are given below.

Accumulation of cadmium in soil and uptake in plants

Model predictions or algorithms can be useful tools to get an impression of future trends. However, they need to be validated by experimental data. We cannot see that such validation has been done in the case of cadmium accumulation in or removal from soil. The various algorithms recommended, result in completely different future trends; while McBride et al.'s algorithm consistently leads to a considerably increased soil cadmium content, other algorithms lead to only a slight accumulation and even a reduced content.

The experimental conditions from which the various algorithms have been derived differ, and as confirmed by McBride, the dilution of the soil solution in their experiments has not been corrected for in the derivation of their algorithm. In recent communication with Norsk Hydro McBride expresses: "...we made no correction for the dilution of the soil solution by the extracting solution, so the regressions we

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obtained should not be used to estimate the soluble cadmium in soil solutions of these same soils". He also confirms that calculation of distribution coefficients based on this algorithm will be too high. Hence, the McBride algorithm cannot be used to estimate the soluble cadmium concentration in soils. Without corrections, the algorithm will predict a higher level of soil accumulation than what is found in nature.

The algorithm developed by Römken and Salomons reflects natural soil conditions better. According to this algorithm, the danger of soil accumulation is considerably exaggerated. Long-term field trials and historical trends in crop cadmium content support this view.

The algorithms used to estimate crop cadmium uptake in plants are based on soil characteristics such as total cadmium content, pH and organic matter. These factors explain less than one third of the uptake pattern. Precipitation, an important determinant for crop cadmium content, is not included in these algorithms.

Analyses on stored wheat samples from Sweden, which have been used as an indication of increased cadmium content of crops, show no statistically significant change in cadmium content over time.

Most countries have based their risk assessments on the McBride algorithm. This is scientifically wrong, predicting unrealistically high cadmium uptake in soils.

There is insufficient scientific evidence to substantiate the accuracy of algorithms used in the risk assessments on cadmium uptake in plants.

It is our opinion that the estimations of future accumulation of cadmium in soil and uptake in plants must be improved and verified, with new risk assessments, before decisions can be made on restricting the cadmium content in fertilizers to levels below 60 mg per kg P_2O_5 .

Further arguments and discussion on the cadmium accumulation in soil and cadmium uptake in plants are provided in the attached Norsk Hydro document:

Marit Læg Reid: "EU cadmium legislation: Evaluation of estimates of plant uptake and soil solubility", Hydro Agri, 27.08.2003.

Cadmium removal technology

Norsk Hydro has carried out extensive research on the development and feasibility of cadmium removal technologies in co-operation with external industries and research institutes. More than 5 mill € have been spent in the past 20 years, without resulting in a cost-efficient technology. The work has covered investigation of the following techniques:

- removal from the phosphate rock by high temperature calcination;
- removal from the phosphoric acid by co-precipitation, ion exchange, and extraction techniques;

- removal in the nitrophosphate process by sulphide precipitation, co-precipitation, ion-exchange, and extraction techniques.

None of the research projects have left the stage of pilot plant.

Our research projects have given high estimates for investment and operational costs. Our estimates are in the range 4-10 times higher per ton of P_2O_5 compared to the estimates given in the ERM report, which is the basis for the Commission's proposal on cadmium regulation.

In addition, most of the technologies being investigated contain large uncertainties and unresolved issues regarding:

- acceptance and cost of disposal of cadmium waste materials;
- possibility for upgrading of cadmium waste;
- additional cadmium effluents to the marine environment and to groundwater from land deposits;
- additional risks associated with the occupational working environment.

Norsk Hydro does not see the possibility of developing a commercially and technically sustainable cadmium removal process for the European fertilizer industry in the short term.

Even if successful technically speaking, the cost of a cadmium removal process will likely be many times the cost given in the ERM background documents making the process unsustainable.

Please contact Tore.K.Jenssen@hydro.com should more detailed information be required on Hydro Agri's research on cadmium removal technologies.

Availability and cost of P sources for fertilizers

It is evident that without a reliable and cost-efficient cadmium removal technology, the availability of P_2O_5 with low cadmium content is limited. A strict regulation on the cadmium content will have severe effects on our industry since the cost of acceptable rock phosphate and phosphoric acid for fertilizer production will increase significantly.

The cost of rock phosphate is expected to increase at least by 10 % in the short term. In addition, it is expected that Russia, being the main supplier of low cadmium rock phosphate, will reduce the export capacity due to higher domestic production of fertilizers, partly for an increasing domestic consumption and partly for export purposes. This will result in additional costs for West European fertilizer producers and farmers.

The stricter supply situation for West European fertilizer producers will necessitate a mixing of phosphates with low and high cadmium content in the fertilizer processing units, in order to reach acceptable levels of cadmium per kg P_2O_5 in the finished

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fertilizer. For the nitrophosphate process, which is a dominant part of Hydro Agri's NPK production, the processing conditions are dependent on the use of rock of volcanic origin (e.g. igneous Russian phosphates with low cadmium content). Mixing with rock of sedimentary origin (which contains higher levels of cadmium) will cause severe technical processing problems resulting in as much as 30 % drop in production capacity, foaming requiring use of chemicals, and viscosity problems.

For our NPK factories based on the processing of phosphoric acid, the availability of acid with acceptable quality will be very limited, and costly, if the cadmium content in fertilizers is set to levels below 60 mg per kg P_2O_5 . As a result, several of our NPK plants in Europe will not be profitable and closures must be expected.

A European-wide restriction of cadmium in fertilizers will result in limited availability of supplies of rock phosphate and phosphoric acid of acceptable quality. The cost increase of supplies will have detrimental effects on the West European fertilizer industry and farming community.

Please contact Tore.K.Jenssen@hydro.com should more detailed information be required on the future supply situation and cost of phosphate rock and phosphoric acid for Hydro Agri.

For these reasons Hydro Agri urges the Commission to reconsider the proposal for cadmium limitations in fertilizers.

For Hydro Agri,
Tore K. Jenssen
Vice President, Product Stewardship and Regulatory Affairs

Attachment:

Marit Lægreid: "EU cadmium legislation: Evaluation of estimates of plant uptake and soil solubility", Hydro Agri, 27.08.2003