



**Economic and Social
Council**

Distr.
GENERAL

ECE/EB.AIR/WG.5/2010/5
1 February 2010

Original: ENGLISH

ECONOMIC COMMISSION FOR EUROPE

**EXECUTIVE BODY FOR THE CONVENTION ON LONG-RANGE
TRANSBOUNDARY AIR POLLUTION**

Working Group on Strategies and Review

Forty-sixth session
Geneva, 12–15 April 2010
Item 3 of the provisional agenda

OPTIONS FOR REVISING THE GOTHENBURG PROTOCOL

DRAFT REVISED TECHNICAL ANNEX IX

Note by the secretariat

Summary

At its forty-fifth session in September 2009, the Working Group on Strategies and Review welcomed the work carried out by the Task Force on Reactive Nitrogen on updating technical annex IX, the guidance documents and the framework code on agricultural practice. It requested the Task Force secretariat to prepare a proposal for the forty-sixth session of the Working Group in April 2010 (ECE/EB.AIR/WG.5/98, paragraph 46 (m)). This note presents options for a draft revised technical annex IX as suggested by the Task Force on Reactive Nitrogen, which provided justifying remarks in the report of its third meeting (ECE/EB.AIR/WG.5/2010/4).

Annex IX¹

MEASURES FOR THE CONTROL OF EMISSIONS OF AMMONIA FROM AGRICULTURAL SOURCES

1. The Parties that are subject to obligations in article 3, paragraph 8 (a), shall take the measures set out in this annex.
2. Each Party shall take due account of the need to reduce losses from the whole nitrogen cycle. [insert: Each Party shall ensure that efforts are made to develop strategies for increasing nitrogen-use efficiency in crop and animal production. A high nitrogen-use efficiency is indicative for low nitrogen losses, low risk of pollution swapping and a high economic return on farm expenditure.]

A. Advisory code of good agricultural practice

3. [delete: Within one year from the date of entry into force of the present Protocol for it, a] [insert: Each] Party shall establish, publish and disseminate an advisory code of good agricultural practice to control ammonia emissions [delete:.] [insert: , based on the framework code for good agricultural practices for reducing emissions of ammonia, adopted by the Executive Body at its thirty-third session (EB.AIR/WG.5/2001/7) and any amendment thereto.] The [insert: advisory] code shall take into account the specific conditions within the territory of the Party and shall include provisions on the following items:

- (a) Nitrogen management, taking into account the full nitrogen cycle;
- (b) Livestock feeding strategies;
- (c) Low-emission manure spreading [delete: techniques] [insert: approaches];
- (d) Low-emission manure storage systems;
- (e) Low-emission animal housing systems;
- (f) Possibilities for limiting ammonia emissions from the use of mineral fertilizers.

[insert: The advisory code shall be reviewed and updated at least every five years and whenever the framework code is revised; it shall take into account the most recent insights and developments related to ammonia emissions abatement.] Parties should give a title to the code with a view to avoiding confusion with other codes of guidance. [insert: Parties are encouraged to link the advisory code to other codes of good agricultural practices describing good management of the overall nitrogen cycle.]

B. Nitrogen management, taking into account the full nitrogen cycle

4. Each party shall ensure that all available on-farm nitrogen sources (for example, manure, crop residues, biological fixed nitrogen and atmospheric deposition) and external nitrogen inputs (for example, mineral fertilizers, composts, manures) are used effectively. For that purpose, each

¹ The revised order and numbering of sections and paragraphs are not included as bracketed text.

party shall ensure that nitrogen input-output balances are used on representative or demonstration farms within one year of entry into force of the revised protocol. These input-output balances shall be used to verify a relative improvement of {30 per cent (option A); 20 per cent (option B); 10 per cent (option C)} of the nitrogen-use efficiency on these farms over a five-year period. The improvement shall continue under a continuous programme until a level of high efficiency is achieved, as specified in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto. Based on the experience gained with the methods applied on demonstration farms, Parties shall ensure that nitrogen input-output balances are implemented on all large farms (see annexes I and II of document ECE/EB.AIR/WG.5/2010/4 for definition of sizes) within five years of entry into force of the revised protocol. These input-output balances shall be used to verify a relative improvement of {30 per cent (option A); 20 per cent (option B); 10 per cent (option C)} of the nitrogen-use efficiency on these farms over a five-year period. The improvement shall continue under a continuous programme until a level of high efficiency is achieved, as specified in the Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto.

C. Livestock feeding strategies

5. Each party shall ensure that low-protein animal feeding strategies are used, at least on all large farms (see annexes I and II of document ECE/EB.AIR/WG.5/2010/4 for definition of sizes), within one year of entry into force of the revised protocol. The parties shall ensure that these feeding strategies result in a relative reduction of both the ammonia volatilization potential and the nitrogen excretion of {15 per cent (option A); 10 per cent (option B); 5 per cent (option C)} over a five-year period. The use of low-protein animal feeding strategies shall continue under a continuous programme until a low level of ammonia volatilization potential and nitrogen excretion has been achieved in a continuous improvement programme, as specified in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto.

D. Animal housing

6. [~~delete: Within one year from the date of entry into force of the present Protocol for it, a Party shall use, for new animal housing on large pig and poultry farms of 2,000 fattening pigs or 750 sows or 40,000 poultry, housing systems which have been shown to reduce emissions by 20 per cent or more compared to the reference (as listed in the Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto), or other systems or techniques with a demonstrably equivalent efficiency. 2/ Applicability may be limited for animal welfare reasons, for instance in straw-based systems for pigs and aviary and free-range systems for poultry.]~~

7. [~~insert: Within one year of the date of entry into force of the present Protocol for it, a Party shall use, for new or largely rebuilt animal housing for cattle, housing systems that can reduce ammonia emissions by at least 25 per cent {single option} compared with the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, where the Party considers this technically and economically feasible and acceptable for animal welfare reasons.~~

8. Within one year of the date of entry into force of the present Protocol for it, a Party shall use, for new or largely rebuilt animal housing for pigs other than lactating sows, housing systems that have been shown to reduce ammonia emissions compared with the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, by at least {60 per cent (option A); 25 per cent for locations where the average temperature of the warmest month exceeds 20°C (based on a five-year mean) and 50 per cent for other locations (option B); 25 per cent (option C)}.

9. Within one year of the date of entry into force of the present Protocol for it, a Party shall use, for new or largely rebuilt animal housing for lactating sows, housing systems that have been shown to reduce ammonia emissions compared with the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, by at least {35 per cent for locations where the average air temperature of the warmest month exceeds 20°C (based on a five-year mean) and 65 per cent for other locations (option A); 35 per cent (option B); 25 per cent (option C)}.

10. Within one year of the date of entry into force of the present Protocol for it, a Party shall use, for new or largely rebuilt animal housing for broilers, housing systems that can reduce ammonia emissions compared with the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, by at least 20 per cent {single option proposed at this stage}.

11. Within one year of the date of entry into force of the present Protocol for it, a Party shall use, for new or largely rebuilt housing for laying hens, housing systems that can reduce ammonia emissions compared with the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, by at least {60 per cent for layer hens in cages and non-caged layer hens (option A); 50 per cent for layer hens in cages and 60 per cent for non-caged layer hens; 30 per cent for layer hens in cages and 60 per cent for non-caged layer hens (option C)}.

12. Within one year of the date of entry into force of the present Protocol for it, a Party shall use, for new or largely rebuilt mechanically ventilated livestock housing for other livestock categories, housing systems which have been shown to reduce emissions compared with the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, by at least {50 per cent (option A); 30 per cent (option B); 20 per cent (option C)}.

13. For existing animal housing and for new or largely rebuilt naturally ventilated housing for other livestock categories, a Party shall use such low-emission housing systems, provided it considers them technically and economically feasible.]

E. [~~delete: Manure~~] [~~insert: Slurry~~] storage

14. Within one year of the date of entry into force of the present Protocol for it, a Party shall [~~delete: use; insert: ensure that the following approaches are used~~] for new slurry, [~~delete: ,~~][~~insert: : outside~~] stores [~~delete: on large pig and poultry farms of 2,000 fattening pigs or 750 sows or 40,000 poultry~~], or low-emission storage systems or techniques that have been

shown to reduce ammonia emissions by {80 per cent (option A); 60 per cent (option B); 40 per cent (option C)} or more compared to the reference, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, [~~delete~~: or other systems or techniques with a demonstrably equivalent efficiency. 2/]

15. For existing slurry stores [~~delete~~: on large pig and poultry farms of 2,000 fattening pigs or 750 sows or 40,000 poultry], a Party shall [~~delete~~: achieve] [~~insert~~: ensure that] ammonia emission reductions of [~~insert~~: at least] 40 per cent [~~insert~~: are achieved compared with the reference described in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto. For existing very large lagoons, a Party shall ensure that ammonia emission reductions of 40 per cent are achieved compared with the reference, as described in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, provided the Party considers it technically and economically feasible. [~~delete~~: insofar as the Party considers the necessary techniques to be technically and economically feasible. 2/] The timescales for the application of these measures shall be as follows: [~~delete~~: 31 December 2009] [~~insert~~: {on ratification (options A, B); 31 December 2019 (option C)}] for Parties with economies in transition and [~~delete~~: 31 December 2007] [~~insert~~: {on ratification (options A, B); 31 December 2017}] for all other Parties. 1/

F. Manure application

16. Each Party shall ensure that low-emission slurry [~~insert~~: and solid manure] application [~~delete~~: techniques] [~~insert~~: approaches], as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, [~~delete~~: that have been shown to reduce emissions by at least 30 per cent compared with the reference specified in that guidance document] are used [~~delete~~: as far as the Party in question considers them applicable], [~~insert~~: selecting approaches] that take into account local soil and geomorphological conditions, slurry [~~delete~~: type] [~~insert~~: characteristics] and farm structure [~~insert~~: , as specified in the table below]. The timescales for the application of these measures shall be: 31 December [~~delete~~: 2009] [~~insert~~: 2019] for Parties with economies in transition and [~~delete~~: 31 December 2007] [~~insert~~: 31 December 2017] for other Parties, in order to allow gradual accommodation by the sector. 1/ [~~delete~~: Within one year from the date of entry into force of the present Protocol for it, a Party shall ensure that solid manure applied to land to be ploughed shall be incorporated within at least 24 hours of spreading as far as it considers this measure applicable, taking account of local soil and geomorphological conditions and farm structure.]

[INSERT TABLE: { **Ammonia emission reduction requirements for slurry and solid manure application (option A)**

Category	Requirement ^a	Description or rationale
Standard requirement for arable land and grassland	To use methods that reduce emissions by at least 60% compared with the reference method	Default requirement
For slurry application to solid-seeded winter cereal crops after seedling emergence	To use methods that reduce emissions by at least 50% compared with the reference method	Slurry injection methods are not suitable for application in winter cereal crops after seedling emergence.
For solid manure application to grassland or arable crops after sowing	To use methods that reduce emissions by at least 30% compared with the reference, provided the Party considers this feasible	Incorporation of solid manure is not possible for grasslands and arable crops after sowing.
For mainly livestock farm holdings with less than the following thresholds: (a) 50 or 100 livestock units for cattle (see annexes I and II of document ECE/EB.AIR/WG.5/2010/4) (b) 40 000 livestock places for poultry (c) 2 000 livestock places for fattener pigs (d) 750 livestock places for sows	To use methods that reduce emissions by at least 30% compared with the reference	Economies of scale make it more costly to apply low-emission techniques on small farms, unless contractors are used.
For slurry applications to fields where the slope is more than 15% from horizontal	To use methods that reduce emissions by at least 30% compared with the reference	Nutrient loss by run-off can be increased by the presence of injection channels on steep slopes. Slurry application to fields where the slope is above 15% increases the risk of water pollution, especially when close to water courses on vulnerable soils. Therefore, application on these fields should be avoided.
For slurry application to stony fields or high clay soils (> 35% clay particle content) in very dry conditions or peat soils (> 25% organic matter content)	To use methods that reduce emissions by at least 30% compared with the reference	Injection techniques are not suitable under these conditions.

^a The reference specified is listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1)] and any amendments thereto.

Ammonia emission reduction requirements for slurry and solid manure application (option B)

Category	Requirement ^a	Description or rationale
Standard requirement for arable land and grassland	To use methods that reduce emissions by at least 30% compared with the reference method	Default requirement
For solid manure application to grassland or arable crops after sowing	To use methods that reduce emissions by at least 30% compared with the reference, provided the Party considers this feasible.	Incorporation of solid manure is not possible for grassland and arable crops after sowing.

^a The reference specified is that listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1)] and any amendments thereto.

Ammonia emission reduction requirements for slurry and solid manure application (option C)

Category	Requirement ^a	Description or rationale
Standard requirement for arable land and grassland	To use methods that reduce emissions by at least 30% compared with the reference method	Default requirement
For mainly livestock farm holdings with less than the following thresholds: <ul style="list-style-type: none"> (a) 50/100 livestock units for cattle (see annexes I and II of document ECE/EB.AIR/WG.5/2010/4) (b) 40,000 livestock places for poultry (c) 2000 livestock places for fattener pigs (d) 750 livestock places for sows 	To use methods that reduce emissions by at least 30% compared with the reference, provided the Party considers this feasible	Economies of scale make it more costly to apply low-emission techniques on small farms unless contractors are used.
For solid manure application to grassland or arable crops after sowing	To use methods that reduce emissions by at least 30% compared with the reference, provided the Party considers this feasible.	Incorporation of solid manure is not possible for grasslands and arable crops after sowing.

^a The reference specified is listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1)] and any amendments thereto. }]

G. Urea- and ammonium [~~delete: carbonate~~] [~~insert: -based~~] fertilizers

17. Within one year of the date of entry into force of the present Protocol for it, a Party shall [~~delete: take such steps as are feasible to limit ammonia emissions from the use of solid fertilizers based on urea.~~] [~~insert: ensure that low-emission application approaches for fertilizers based on urea, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, that have been shown to reduce ammonia emissions by at least {80 per cent (option A); 50 per cent (option B); 30 per cent (option C)} compared with the reference specified in that guidance document, are used.~~]

18. Within one year of the date of entry into force of the present Protocol for it, a Party shall prohibit the use of ammonium carbonate fertilizers.

19. [~~insert: Within one year of the date of entry into force of the amended Protocol for it, a Party shall ensure that, where fertilizers based predominantly on ammonium sulphate or ammonium phosphate are applied to calcareous soils, the Party shall ensure that low-emission application techniques, as listed in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, that have been shown to reduce mean ammonia emissions by at least {80 per cent (option A); 50 per cent (option B); 30 per cent (option C)} as compared with the reference specified in that guidance document, are used.~~]²

H. Reporting requirements

20. [~~insert: Parties shall report on a periodic basis, in accordance with article 7, paragraph (1) (a), quantitative data on the selection, implementation, effectiveness and efficiency of measures as outlined in this Annex, to facilitate the sharing of information and experience of ammonia mitigation in the context of the wider nitrogen cycle.~~]

21. Where measures are used, other than those listed as Category 1 in Guidance Document V adopted by the Executive Body at its seventeenth session (decision 1999/1) and any amendments thereto, Parties shall report and provide justification of the verification procedures used to estimate the abatement efficiencies specified, according to the principles set out in that guidance document.]

² This paragraph was proposed based on current understanding, pending full documentation of further evaluations and fertilizer trials.

Notes

1/ For the purpose of the present annex, a country with an economy in transition refers to a Party that, by means of its instrument of ratification, acceptance, approval or accession, has made a declaration stating that it wishes to be treated as a country with an economy in transition for the purposes of paragraphs 6 and/or 9 of this annex.

[delete: 2/ Where a Party judges that other systems or techniques with a demonstrably equivalent efficiency can be used for manure storage and animal housing in order to comply with paragraphs 8 and 10, or where a Party judges the reduction of emissions from manure storage required under paragraph 9 not to be technically or economically feasible, documentation to this effect shall be reported in accordance with article 7, paragraph 1 (a).]
