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

Working Group on Strategies and Review

Forty-fifth session
Geneva, 31 August–4 September 2009
Item 4 of the provisional agenda

OPTIONS FOR REVISING THE GOTHENBURG PROTOCOL

DRAFT REVISED TECHNICAL ANNEX IV

Note by the secretariat

Summary

At its forty-fourth session in April 2009, the Working Group on Strategies and Review welcomed the work carried out by the Expert Group on Techno-economic issues on updating the technical annexes IV, V, VI and VIII and the guidance documents and on elaborating new annexes on volatile organic compounds (VOC) in products and on particulate matter (PM). It requested the secretariat to submit them as official documents for negotiation at the forty-fifth session of the Working Group (ECE/EB.AIR/WG.5/96, para. 42 (d–e)). This note presents a draft revised technical annex IV as suggested by the Expert Group on Techno-economic Issues.

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Annex IV

LIMIT VALUES FOR EMISSIONS OF SULPHUR FROM STATIONARY SOURCES

1. Section A applies to Parties other than Canada and the United States of America, section B applies to Canada and section C applies to the United States of America.

A. Parties other than Canada and the United States of America

2. For the purpose of section A, except tables 3, 4 and 5, limit value means the quantity of a gaseous substance contained in the waste gases from an installation that is not to be exceeded. Unless otherwise specified, it shall be calculated in terms of mass of pollutant per volume of the waste gases (expressed as mg/m^3), assuming standard conditions for temperature and pressure for dry gas (volume at 273.15 K, 101.3 kPa). With regard to the oxygen content of the exhaust gas, the values given in the tables below for each source category shall apply. Dilution for the purpose of lowering concentrations of pollutants in waste gases is not permitted. Start-up, shutdown and maintenance of equipment are excluded.

3. Emissions shall be monitored[a] in all cases. Compliance with limit values shall be verified. The methods of verification can include continuous or discontinuous measurements, type approval, or any other technically sound method. In case of continuous measurements, compliance with the emission standards is achieved if the validated [daily/monthly][b] emission average does not exceed the limit values. In case of discontinuous measurements or other appropriate determination procedures, compliance with the emission standards is achieved if the mean value based on an appropriate number of measurements under representative conditions does not exceed the value of the emission standard. The inaccuracy of the continuous and discontinuous measurement methods may be taken into account for verification purposes.

4. Sampling and analysis of relevant polluting substances and measurements of process parameters , as well as the quality assurance of automated measuring systems and the reference measurement methods to calibrate those systems, shall be carried out in accordance with CEN

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[a] Monitoring is to be understood as an overall activity, comprising measuring or calculating of emissions, mass balancing, etc. It can be carried out continuously or discontinuously.

[b] One option is to define the ELVs as daily averages, another option is to define the ELVs as monthly averages; shorter averaging periods can be considered as being more strict.

standards. If CEN standards are not available, ISO standards, national or international standards which will ensure the provision of data of an equivalent scientific quality shall apply.

5. Special provisions for combustion plants with a rated thermal input exceeding 50 MWth and for combustion plants when combined to a common stack with a total rated input exceeding 50 MWth:

5.1 The competent authority may grant derogation from the obligation to comply with the emission limit values provided for in paragraph 7 in the following cases:

[a) for SO_2 in respect of a combustion plant which to this end normally uses low-sulphur fuel, in cases where the operator is unable to comply with those limit values because of an interruption in the supply of low-sulphur fuel resulting from a serious shortage]

[b) for SO_2 in respect of a combustion plant firing indigenous solid fuel, which cannot comply with the emission limit values for SO_2 provided for in paragraph 7; instead at least following rates of desulphurisation have to be met:

Existing plants: 50 - 300 MW: 92 %
New plants: 50 - 300 MW: 93 %
Existing plants: > 300 MW: 96 %
New plants: > 300 MW: 97 %

[c) for combustion plants using [only / mainly] gaseous fuel who have to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and for this reason would need to be equipped with a waste gas purification facility]

[d) for combustion plants not operated more than XXX operating hours, starting from DATE and ending no later than DATE]

[e) for existing combustion plants using solid or liquid fuels not operated more than 1500 operating hours per year as a rolling average over a period of five years; instead following emission limit values apply:

for solid fuels: [option 1 = 800 mg/Nm³; option 2 = 800 mg/Nm³; option 3 = 2000 mg/Nm³][1]

for liquid fuels: [option 1 = 850 mg/Nm³; option 2 = 850 mg/Nm³; option 3 = 1700 mg/Nm³][1]

5.2 Where a combustion plant is extended by at least 50MW, the emission limit value specified in paragraph 7 for new installations shall apply to the extensional part and to the part of the plant affected by the change.

5.3 Parties shall ensure that provisions are made in the permits for procedures relating to malfunction or breakdown of the abatement equipment.

5.4 In the case of a multi-fuel firing combustion plant involving the simultaneous use of two or more fuels, the competent authority shall provide rules for setting the emission limit values.

6. Mineral oil refineries complying with the overall SO_2 limit value set in table 1 may be exempted from compliance with the individual SO_2 limit values provided in this annex. Following alternative bubble SO_2 limit value may be used, referring to the sum of the emissions from all combustion plants and process installations expressed as an average concentration and at a reference oxygen content of [3%]:

Table 1. Suggested options for limit values for SO_X emissions released from refineries using the bubble concept

Plant type	**Suggested ELV for SO_x [mg/Nm³]**		
	Option 1[1/]	**Option 2[1/]**	**Option 3[1/]**
Mineral oil refinery	200	600	1000

Combustion plants (boilers and process heaters) with a rated thermal input exceeding 50 MWth or combustion plants when combined to a common stack with a total rated input exceeding 50 MWth[c]:

[c] Individual combustion plants below 15 MWth shall not be considered to calculate the total rated input.

Table 2. Suggested options for limit values for SO_x emissions released from boilers [and process heaters][a/]

Fuel type	Thermal input [MWth]	Suggested ELV for SO_x [mg/Nm³] [b/]		
		Option 1[1/]	Option 2[1/]	Option 3[1/]
Solid fuels	50-100	New plants: 300 (coal, lignite) 250 (peat) 100 (biomass)	New plants: 400 (coal, lignite) 300 (peat) 150 (biomass)	New plants: 850 (coal, lignite) 850 (peat) 200 (biomass)
		Existing plants: 300 (coal, lignite) 250 (peat) 100 (biomass)	Existing plants: 400 (coal, lignite) 300 (peat) 150 (biomass)	Existing plants: 2000 (coal, lignite) 2000 (peat) 2000 biomass)
	100-300	New plants: 150 (coal, lignite) 300 (peat) 100 (biomass)	New plants: 200 (coal, lignite) 300 (peat) 150 (biomass)	New plants: 200 (coal, lignite) 300 (peat) 200 (biomass)
		Existing plants: 150 (coal, lignite) 250 (peat) 100 (biomass)	Existing plants: 250 (coal, lignite) 300 (peat) 150 (biomass)	Existing plants: 2000 (coal, lignite) 2000 (peat) 2000 (biomass)
	>300	New plants: 100 (coal, lignite) (FBC: 150) 100 (peat) (FBC:100) 100 (biomass)	New plants: 150 (coal, lignite) (FBC: 200) 150 (peat) (FBC: 200) 150 (biomass)	New plants: 200 (coal, lignite) 200 (peat) 200 (biomass)
		Existing plants: 100 (coal, lignite) (FBC: 150) 100 (peat) 100 (biomass)	Existing plants: 200 (coal, lignite) 200 (peat) 150 (biomass)	Existing plants: 1200 (coal, lignite) 1200 (peat) 1200 (biomass)
Liquid fuels	50-100	New plants: 200	New plants: 350	New plants: 850
		Existing plants: 200	Existing plants: 350	Existing plants: 1700
	100-300	New plants: 150	New plants: 200	New plants: 400
		Existing plants: 150	Existing plants: 250	Existing plants: 1700
	>300	New plants: 100	New plants: 150	New plants: 200
		Existing plants: 100	Existing plants: 200	Existing plants: 1700
Gaseous fuels in general	>50	New plants: 10	New plants: 20	New plants: 35
		Existing plants: 10	Existing plants: 30	Existing plants: 35

Fuel type	Thermal input [MWth]	Suggested ELV for SO_x [mg/Nm³] [b/]		
		Option 1[1/]	Option 2[1/]	Option 3[1/]
Liquefied gas	>50	New plants: 5	New plants: 5	New plants: 5
		Existing plants: 5	Existing plants: 5	Existing plants: 5
Low-calorific-value gases[c/]	>50	New plants: 200	New plants: 200	New plants: 400
		Existing plants: 200	Existing plants: 250	Existing plants: 800
Low calorific gases from blast furnace and BOF	>50	New plants: 200	New plants: 200	New plants: 200
		Existing plants: 200	Existing plants: 400	Existing plants: 800
FBC fluidized bed combustion (circulating, pressurized, bubbling)				

a/ In particular, the limit values shall not apply to:

- Plants where the combustion process is an integrated part of a specific production, for example the coke oven used in the Iron and Steel industry and glass and ceramics production plants;
- Plants in which the products of combustion are used for direct heating, drying, or any other treatment of objects or materials;
- Post-combustion plants designed to purify the waste gases by combustion which are not operated as independent combustion plants;
- Facilities for the regeneration of catalytic cracking catalysts;
- Facilities for the conversion of hydrogen sulphide into sulphur;
- Reactors used in the chemical industry;
- Coke battery furnaces;
- Cowpers;
- [Recovery boilers for black liquor within installations for the production of pulp]
- Waste incinerators; and
- Plant powered by diesel, petrol or gas engines or by combustion turbines, irrespective of the fuel used.
- [Combustion plants running less than 500 hours a year].

b/ The O_2 reference content is 6% for solid fuels and 3% for others.

c/ e.g. gasification of refinery residues or coke oven gas

8. Gas oil:

Table 3. Limit values for the sulphur content of gas oil[a/]

	Sulphur content (per cent by weight)
Gas oil	< 0.1

a/"Gas oil" means any petroleum product within HS 2710, or any petroleum product which, by reason of its distillation limits, falls within the category of middle distillates intended for use as fuel and of which at least 85 per cent by volume, including distillation losses, distils at 350°C. Fuels used in on-road and non-road vehicles and agricultural tractors are excluded from this definition. Gas oil intended for marine use is included in the definition if it meets the description above or it has a viscosity or density falling within the ranges of viscosity or density defined for marine distillates in table I of ISO 8217 (1996).

9. Mineral oil and gas refineries

Claus plant: for plant that produces more than 50 Mg of sulphur a day:

Table 4. Suggested options for limit values for SOx emissions released from sulphur recovery units

Plant type	**Suggested efficiency for sulphur recovery [a/] %**		
	Option 1[1/]	**Option 2[1/]**	**Option 3[1/]**
New plant	99.9	99.8	99.5
Existing plant	99.5	98.5	97

a/ The sulphur recovery rate is the percentage of the imported H_2S converted to elemental sulphur as a yearly average.

10. Titanium dioxide production:

Table 5. Suggested options for limit values for SO_x emissions released from titanium dioxide production.

Plant type	**Suggested ELV for SO_x [kg/t of TiO_2]**		
	Option 1[1/]	**Option 2[1/]**	**Option 3[1/]**
Sulphate process, emission main sources	3	6	10
Chloride process, emission main sources	1.5	1.7	3

B. Canada[2/]

11. Limit values for controlling emissions of sulphur dioxide from new stationary sources in the following stationary source category will be determined on the basis of available information on control technology and levels including limit values applied in other countries and the

following document: Canada Gazette, Part I. Department of the Environment. Thermal Power Generation Emissions - National Guidelines for New Stationary Sources. May 15, 1993. pp. 1633-1638.

C. United States of America[2/]

12. Limit values for controlling emissions of sulphur dioxide from new stationary sources in the following stationary source categories are specified in the following documents:

(a) Electric Utility Steam Generating Units - 40 Code of Federal Regulations (C.F.R.) Part 60, Subpart D, and Subpart Da;
(b) Industrial-Commercial-Institutional Steam Generating Units - 40 C.F.R. Part 60, Subpart Db, and Subpart Dc;
(c) Sulphuric Acid Plants - 40 C.F.R. Part 60, Subpart H;
(d) Petroleum Refineries - 40 C.F.R. Part 60, Subpart J;
(e) Primary Copper Smelters - 40 C.F.R. Part 60, Subpart P;
(f) Primary Zinc Smelters - 40 C.F.R. Part 60, Subpart Q;
(g) Primary Lead Smelters - 40 C.F.R. Part 60, Subpart R;
(h) Stationary Gas Turbines - 40 C.F.R. Part 60, Subpart GG;
(i) Onshore Natural Gas Processing - 40 C.F.R. Part 60, Subpart LLL;
(j) Municipal Waste Combustors - 40 C.F.R. Part 60, Subpart Ea, and Subpart Eb; and
(k) Hospital/Medical/Infectious Waste Incinerators - 40 C.F.R. Part 60, Subpart Ec.

Note

1/ The definitions of option 1, option 2 and option 3 are as follows. These options were designed to leave maximum flexibility for discussion by the Working Group on Strategies and Review.

Options for ELVs are as follows:

- Option 1: ELV1 is a demanding but technically feasible option with the objective of achieving a high level of reduction. The ELV1 is based on a value between the lower and upper BAT AEL, (where it is available),
- Option 2: ELV2, while technically demanding, pays greater attention to the costs of the measures for achieving reduction. The ELV2 is a value based on the upper BAT AEL (where it is available),
- Option 3: ELV 3 represents current [good] practices based on the legislation of a number of Parties to the Convention.

2/ Up to now, no information has been provided by North America, therefore part B and C of the annex have not been modified yet.
