Note by the CAFE-Working group on Implementation

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Subject:
Necessity to prepare action plans to reduce the duration of exceedances of alert thresholds (Art 7(3), 96/62/EC)

February 2003

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Introduction

Action plans under **Article 7, 96/62/EC, i.e. the Air Quality Framework Directive,** are required if there is the risk of exceeding alert thresholds. This guidance note elaborates the necessity of preparing such plans in relation to the alert thresholds for NO_2 and SO_2, as have been laid down in the first daughter directive (1990/30/EC). The necessity to draw up action plans if there is a risk of exceeding **limit values** is not covered by this note.

Article 7 of the Framework Directive reads as follows:

Article 7 Improvement of ambient air quality

General requirements

1. *Member States shall take the necessary measures to ensure compliance with the limit values.*
2. *Measures taken in order to achieve the aims of this Directive shall: (a) take into account an integrated approach to the protection of air, water and soil; (b) not contravene Community legislation on the protection of safety and health of workers at work; (c) have no significant negative effects on the environment in the other Member States.*
3. *Member States shall draw up action plans indicating the measures to be taken in the short term where there is a risk of the limit values and/or alert thresholds being exceeded, in order to reduce that risk and to limit the duration of such an occurrence. Such plans may, depending on the individual case, provide for measures to control and, where necessary, suspend activities, including motor-vehicle traffic, which contribute to the limit values being exceeded.*

Article 7 (3) requires Member States to draw up action plans to be taken if there is a risk of exceeding **alert thresholds**. It is the interpretation of the Working group on Implementation that *a risk of the alert thresholds being exceeded* means that there is a potential for such exceedances to occur, e.g. under adverse meteorological conditions.

Therefore, each Member State has to conduct an assessment if there is a potential or risk of exceeding any alert thresholds laid down in daughter directives. If a Member State concludes that there is a risk of exceeding an alert threshold, the Member State is obliged to produce a plan for those pollutants and areas where such exceedances may happen. Such a plan should be prepared as a blueprint well in advance of an alert case, so that it is available and can be implemented rapidly in a case of an exceedance of an alert threshold.

Is there any risk of exceeding an alert threshold?

Alert thresholds have been set for the pollutants SO_2 and NO_2. Directive 1999/30/EC defines that an alert has to be issued if the area of excess pollution comprises at least 100 km^2 or an entire zone or agglomeration, whichever is the smaller. This suggests that an exceedance recorded at a single hot spot site (e.g., roadside monitoring for NO_2) is not sufficient to trigger an alarm.

Where can exceedances be expected?

- Exceedances of the alert level for NO_2 are very rare and are predominantly recorded in agglomerations with high traffic densities under adverse meteorological conditions.
- The alert value for SO_2 may be exceeded during wintertime (under adverse meteorological conditions) in the vicinity of large point sources such as old power plants without state-of-the-art abatement techniques using solid or liquid fuels with high sulphurcontent.

The European Topic Centre on Air and Climate Change of the European Environment Agency (ETC-ACC) has made an assessment of exceedances of the alert threshold using monitoring data from AirBase (the air quality information system of ETC-ACC). The assessment is annexed to this paper). It was shown that exceedances of the SO_2 alert threshold occurred in the year 2000 at 9 of approx. 1000 stations and for NO_2 at 6 out of more than 1400 monitoring stations. However, ETC-ACC was not able to establish the representativity of those exceedances (e.g., if the area of exceedance was likely to exceed 100 km^2).

If no analysis of the pollution levels in relation to the alert threshold was done within the Preliminary Assessment, an assessment of data series of the previous years should be conducted. This analysis should cover at least five years due to the fact that exceedances of the alert values can only be expected during extreme meteorological conditions.

The Working group on Implementation is of the opinion that

- if no value exceeds 80 % of the alert threshold, it can be concluded that there is no risk of exceedance.
- if fewer data are available (1 – 4 years), there is no risk of exceedance if no level higher than 65 % of the alert value was recorded.
- if values exceed 80 % of the alert threshold, it should be checked if the exceedance was affecting an area larger than 100 km^2. This can be done by using data from other measurement sites, which are usually available at least in agglomerations. If other stations exist, but no levels > 80 % of the alert value was observed, it can be concluded that there is no risk of exceeding the alert threshold in larger areas.
- if concentrations over 80 % of the alert threshold were observed in an area larger then 100 km^2 (or covering a whole zone), it is concluded that there is a risk of exceeding the alert threshold unless the emission situation has improved significantly in the years after the exceedances were observed.

Example of a short term action plan

In Austria, the Smog Alert Act contained[1] general provisions on the establishment of smog alert plans. The plans had to be prepared for region where there was a risk of exceeding the alert thresholds laid down in the annex of the act. Action plans were drafted for three different regions: the agglomerations of Linz, Graz und Vienna. These plans were issued as a provincial ordinance. However, the plans had never to be put into operation.

The plans contained detailed regulations on

- The monitoring sites used for control of pollution levels
- Details of triggering an alarm (area of exceedance, …)
- Information/warning to be issued to the public
- Measures to be taken

The measures include:

- Measures for traffic: Ban of vehicles not equipped with catalytic converters (Except for certain transports,…)
- Domestic sources: Ban of fuels with a sulphur content > 0,2 %,….
- Industrial sources: Ban of certain fuels (with a sulphur content > 0,6 % if no desulphurisation is used),…

The act also had a pre-warning level. After an exceedance of a pre-warning level, the population was informed and asked for voluntary measures.

[1] The smog alert act was abolished in 2001 due to the fact that there is currently no risk of exceeding the alert values.

Annex

Summary of exceedances of alert threshold values of SO2 and NO2

Frank de Leeuw (ETC-ACC)

Available information on hourly concentration data for SO_2 and NO_2 over the period 1990-2000 has been search for exceedances of the alert threshold values.
According to directive 1999/30/EC the alert threshold for SO_2 (NO_2) is defined as "500 $\mu g/m^3$ (resp. 400 $\mu g/m^3$) measured over three consecutive hours at locations representative of air quality over at least 100 km^2 or an entire zone or agglomeration, whichever is the smaller". In the analysis of AIRBASE-data, exceedances are evaluated for each individual monitoring station regardless of the situation on neighbouring stations within a 100 km^2 around the station.
To compensate for the increasing amount of information in AIRBASE for recent years, the probability of an alert, expressed as the number of alert situation per million valid monitoring hours, is presented as well. One million monitoring hours corresponds with *c.* 114 monitoring years.
Note that all AIRBASE information submitted by EU15 and 14 other European countries has been used in the analysis. A separate analysis for the EU15 has not been made.

NO_2

Table 1. Number of alerts, number of monitoring hours, probability of exceedance (cases per million monitoring hours), number of station where an alert has been observed and total number of stations included in the analysis.

year	N -alert	mon hours	P-alert	N-stations	tot stations
1990	1	3.28E+05	3.1	1	42
1991	6	4.29E+05	14.0	2	55
1992	2	6.71E+05	3.0	2	84
1993	0	8.56E+05	0.0	0	106
1994	8	8.06E+05	9.9	4	99
1995	0	8.62E+05	0.0	0	106
1996	0	4.71E+06	0.0	0	569
1997	24	7.35E+06	3.3	19	887
1998	3	8.62E+06	0.3	3	1041
1999	3	1.11E+07	0.3	2	1350
2000	21	1.18E+07	1.8	6	1419

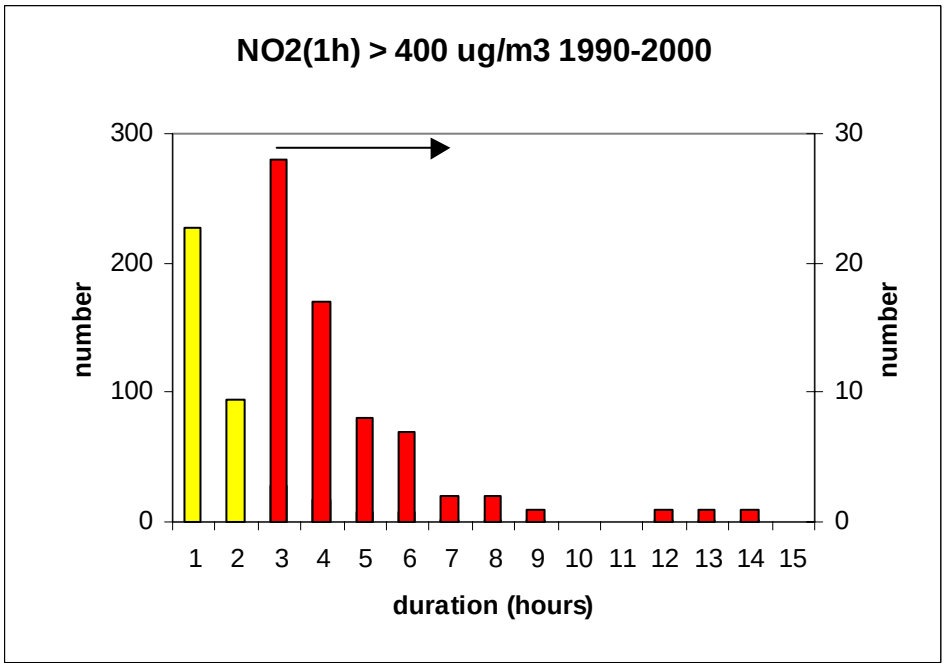

Figure 1. Frequency distribution of the duration (in hours) of a situation with an NO_2 concentration (1h) above 400 µg/m^3; an alert situation is defined when exceedance is measured during at least three hours.

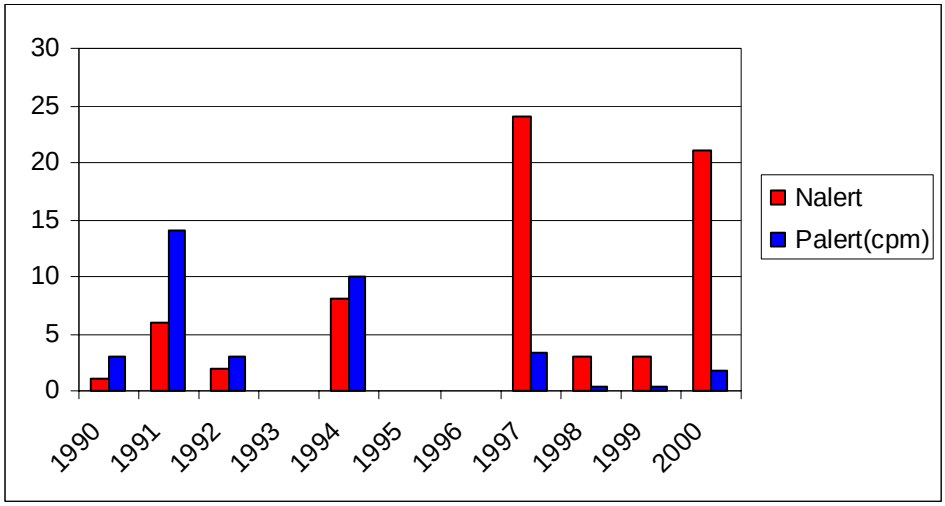

Figure 2. Number of alert situation and probability of an alert situation during the period 1990-2000.

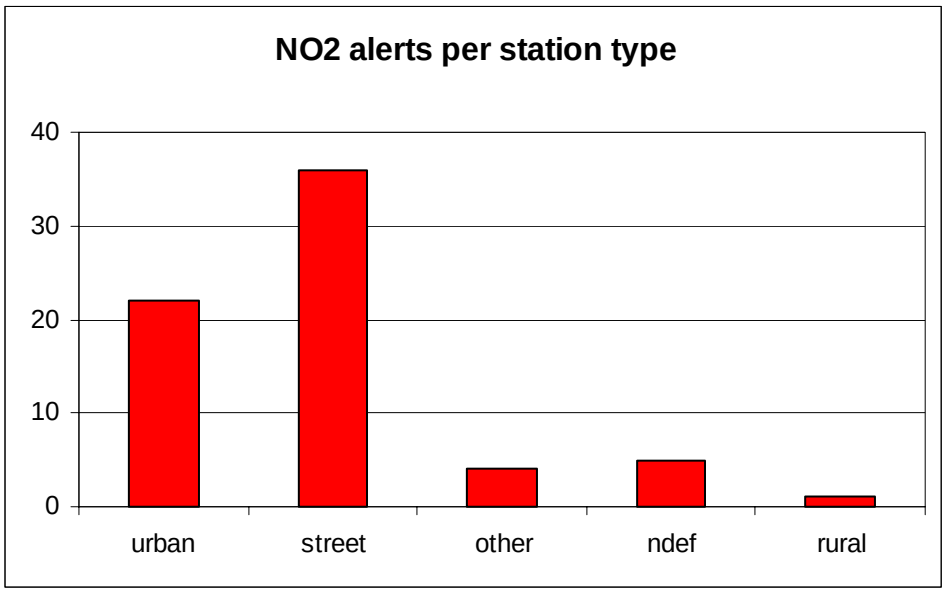

Figure 3. Distribution of the number of alert situation as function of station types, period 1990-2000.

SO_2

Table 2. Number of alerts, number of monitoring hours, probability of exceedance (cases per million monitoring hours), number of stations where an alert has been observed and total number of stations included in analysis.

year	N -alert	mon hours	P-alert (cpm)	N-stations	tot stations
1990	6	1.70E+05	35.2	1	24
1991	6	1.87E+05	32.0	3	26
1992	47	5.45E+05	86.2	17	71
1993	119	7.22E+05	164.7	22	92
1994	32	7.01E+05	45.7	12	88
1995	29	1.04E+06	27.9	8	131
1996	135	5.06E+06	26.7	25	605
1997	28	7.16E+06	3.9	14	860
1998	20	7.22E+06	2.8	12	883
1999	16	8.03E+06	2.0	8	992
2000	16	8.54E+06	1.9	9	1023

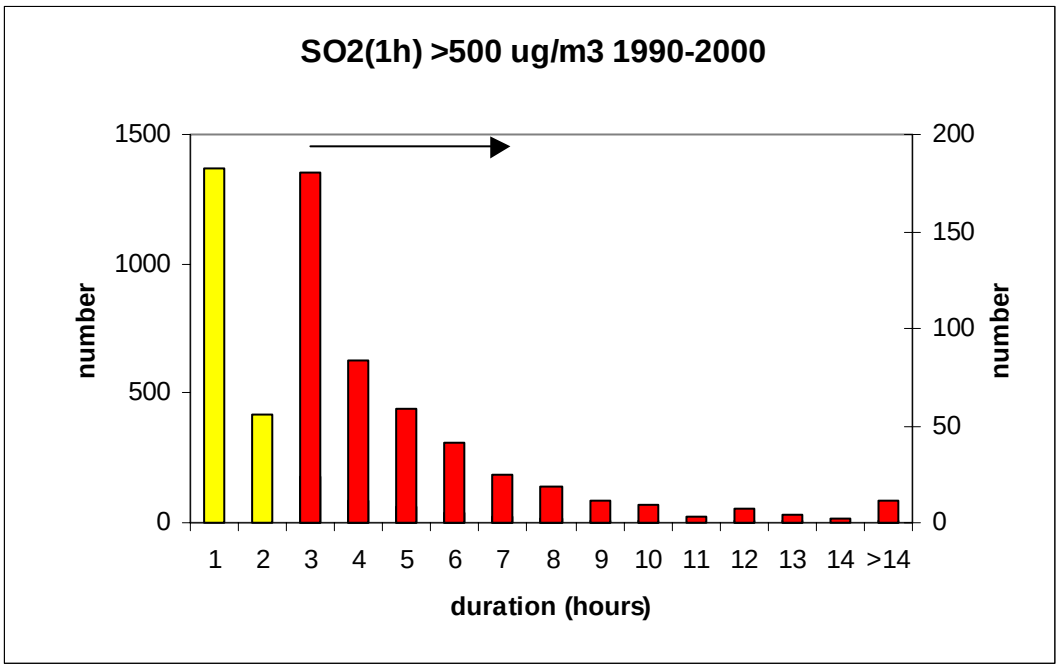

Figure 4. Frequency distribution of the duration (in hours) of a situation with a SO_2 concentration (1h) above 500 µg/m^3; an alert situation is defined when exceedance is measured during at least three hours.

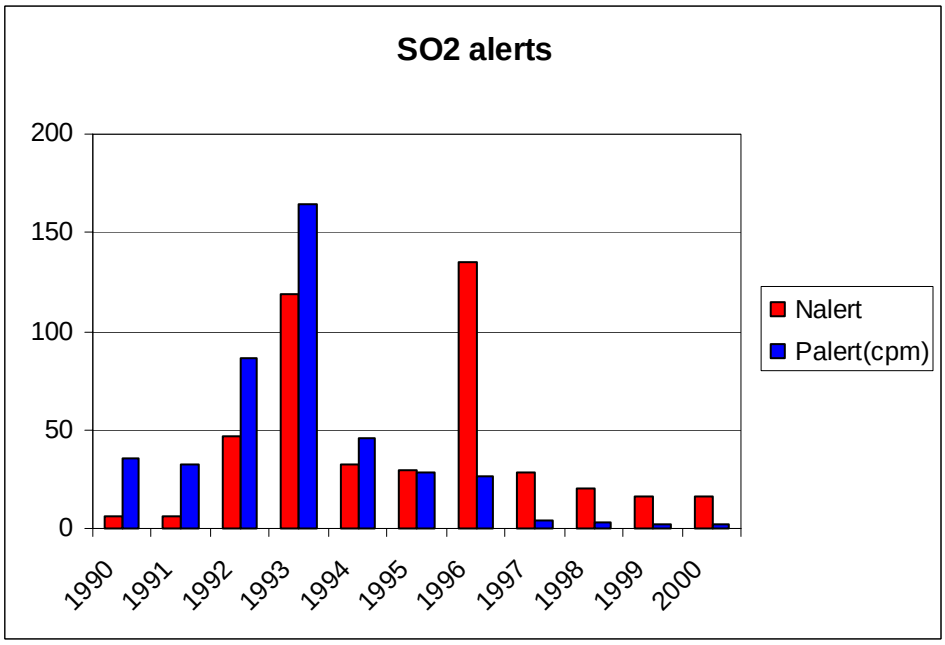

Figure 5. Number of alert situation and probability of an alert situation during the period 1990-2000.

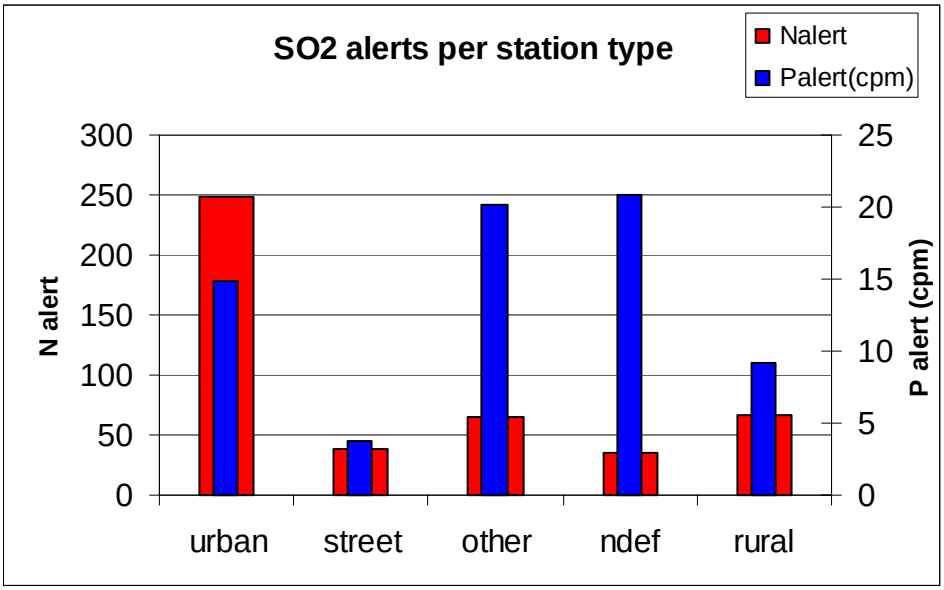

Figure 6. Distribution of the number and probability of alert situations as function of station types, period 1990-2000.