

REGULATION 2.10 Stack Height Considerations

Air Pollution Control District of Jefferson County Jefferson County, Kentucky

Relates To: KRS Chapter 77 Air Pollution Control

Pursuant To: KRS Chapter 77 Air Pollution Control

Necessity And Function: KRS 77.180 provides that the Air Pollution Control Board may make and enforce all needful orders, rules, and regulations necessary or proper to accomplish the purposes of KRS Chapter 77. This regulation establishes the procedures under which stack heights shall be considered in determining compliance of an affected source.

SECTION 1 Applicability

This regulation applies to all stacks, and any other dispersion techniques, constructed in Jefferson County which emit air contaminants from an affected source that was commenced on or after January 1, 1971.

SECTION 2 Definitions

Terms used in this regulation not defined herein shall have the meaning given to them in Regulation 1.02.

- 2.1 "Dispersion technique" means any technique which attempts to affect the concentration of a pollutant in the ambient air by:
 - 2.1.1 Using that portion of a stack which exceeds good engineering practice stack height,
 - 2.1.2 Varying the rate of emission of a pollutant according to atmospheric conditions or ambient concentrations of that pollutant, or
 - 2.1.3 Increasing final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, stack parameters, or combining exhaust gases from several existing stacks into one stack; or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise.
 - 2.1.4 The preceding sentence does not include:
 - 2.1.4.1 The re-heating of a gas stream, following use of a pollution control system, for the purpose of returning the gas to the temperature at which it was originally discharged from the facility generating the gas stream, or
 - 2.1.4.2 The merging of exhaust gas streams where:
 - 2.1.4.2.1 The source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams, and
 - 2.1.4.2.2 After July 8, 1985 such merging is part of a change in operation at the facility that includes the installation of pollution controls and is accompanied by a net reduction in the allowable emissions of a pollutant. This exclusion from the definition of "dispersion techniques" shall apply only to the emission limitation for the pollutant affected by such change in operation, or
 - 2.1.4.2.3 Before July 8, 1985, such merging was part of a change in operation at the facility that included the installation of emissions control equipment or was carried out for sound economic or engineering reasons. Where there was an

increase in the emission limitation or, in the event that no emission limitation was in existence prior to the merging, an increase in the quantity of pollutants actually emitted prior to the merging, the District shall presume that merging was significantly motivated by an intent to gain emissions credit for greater dispersion. Absent a demonstration by the source owner or operator that merging was not significantly motivated by such intent, the District shall deny credit for the effects of such merging in calculating the allowable emissions for the source;

- 2.1.4.3 Smoke management in agricultural or silvicultural prescribed burning programs;
 - 2.1.4.4 Episodic restrictions on residential woodburning and open burning; or
 - 2.1.4.5 Techniques under section 2.3.3 which increase final exhaust gas plume rise where the resulting allowable emissions of sulfur dioxide from the facility do not exceed 5,000 tons per year.
- 2.2 "Emission limitation" or "emission standard" means a requirement established by the Cabinet, the Board, or EPA which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirements which limit the level of opacity, prescribe equipment, set fuel specifications, or prescribe operation or maintenance procedures for a source to assure continuous emission reduction.
- 2.3 "Excessive concentration" as defined for the purpose of determining good engineering practice stack height under section 2.4.3 means:
- 2.3.1 For sources seeking credit for stack height exceeding that established under section 2.4.2.1 or 2.4.2.2, a maximum ground-level concentration due to emissions from a stack due in whole or part to downwash, wakes, and eddy effects produced by nearby structures or nearby terrain features which individually is at least 40% in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and which contributes to a total concentration due to emissions from all sources that is greater than an ambient air quality standard. For sources subject to District Regulations 2.05, or regulations approved pursuant to 40 CFR Section 51.166 or 52.21, an excessive concentration alternatively means a maximum ground-level concentration due to emissions from a stack due in whole or part to downwash, wakes, or eddy effects produced by nearby structures or nearby terrain features which individually is at least 40% in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and greater than a prevention of significant deterioration increment. The allowable emission rate to be used in making demonstrations under this regulation shall be prescribed by the new source performance standard that is applicable to the source category unless the owner or operator demonstrates that this emission rate is infeasible. Where such demonstrations are approved by the District, an alternative emission rate shall be established in consultation with the source owner or operator.
 - 2.3.2 For sources seeking credit after October 11, 1983, for increases in existing stack heights up to the heights established under section 2.4.2.1 or 2.4.2.2; either
 - 2.3.2.1 A maximum ground-level concentration due in whole or part to downwash, wakes or eddy effects as provided in section 2.6.1, except that the emission rate

- specified by the applicable SIP (or, in the absence of such a limit, the actual emission rate) shall be used, or
- 2.3.2.2 The actual presence of a local nuisance caused by the existing stack as determined by the District, and
- 2.3.3 For sources seeking credit after January 12, 1979 for a stack height determined under section 2.4.2.1 or 2.4.2.2 where the District requires the use of a field study or fluid model to verify GEP stack height, for sources seeking stack height credit after November 9, 1984, based on the aerodynamic influence of cooling towers, and for sources seeking stack height credit after December 31, 1970, based on the aerodynamic influence of structures not adequately represented by the equations in sections 2.4.2.1 and 2.4.2.2, a maximum ground-level concentration due in whole or part to downwash, wakes or eddy effects that is at least 40% in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects.
- 2.4 "Good engineering practice" (GEP) stack height means the greater of:
- 2.4.1 65 meters (213.25 feet), measured from the ground-level elevation at the base of the stack:
- 2.4.2.1 For stacks in existence on January 12, 1979, and for which the owner or operator had obtained all applicable pre-construction permits or approvals required under District Regulations approved pursuant to 40 CFR Parts 51 and 52. Good engineering practice stack height is two and five tenths multiplied by the height of the nearby structures measured from the ground-level elevation at the base of the stack, $H_g = 2.5H$, provided the owner or operator produces evidence that this equation was actually relied on in establishing an emission limitation:
- 2.4.2.2 For all other stacks, GEP stack height shall be determined by the following equation, provided that the District, State or EPA may require the use of a field study or fluid model to verify GEP stack height for the source:

$$H_g = H + 1.5L$$

where:

H_g = GEP stack height, measured from the ground-level elevation at the base of the stack.

H = Height of nearby structures measured from the ground-level elevation at the base of the stack.

L = Lesser dimension (height or projected width) of nearby structures, or

- 2.4.3 The height demonstrated by a fluid model or a field study approved by the District, State or EPA, which ensures that the emissions from a stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures or nearby terrain features.
- 2.4.3.1 The fluid model study shall be conducted in accordance with guidelines published by EPA in "Guideline for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height," July 1981, EPA Office of Air Quality Planning and

Standards, EPA-450/4-81-003; and "Guideline for Fluid Modeling of Atmospheric Diffusion", April 1981, EPA Environmental Sciences Research Laboratory, EPA-600/8- 81-009.

- 2.5 "Nearby" as used in section 2.4 is defined for a specific structure or terrain feature; and
- 2.5.1 For purposes of applying the formulae provided in 2.4.2.1 and 2.4.2.2 means that distance up to five times the lesser of the height or the width dimension of a structure, but not greater than 0.8 km (1/2 mile), and
- 2.5.2 For conducting demonstrations under section 2.4.3 means not greater than 0.8 km (1/2 mile), except that the portion of a terrain feature may be considered to be nearby if it falls within a distance of up to ten times the maximum height (Ht) of the feature, not to exceed two miles if such feature achieves a height (Ht) 0.8 km from the stack that is at least 40% of the GEP stack height determined by the formulae provided in section 2.4.2.2 or 26 meters (85.3 feet), whichever is greater, as measured from the ground- level elevation at the base of the stack. The height of the structure or terrain feature is measured from the ground- level elevation at the base of the stack.
- 2.6 "Stack" means any point in a source designed to emit solids, liquids, or gases into the air, including a pipe or duct but not including flares.
- 2.7 "Stack in existence" means that the owner or operator had begun, or caused to begin, a continuous program of physical on-site construction of the stack; or, entered into binding agreements or contractual obligations which could not be cancelled or modified without substantial loss to the owner or operator to undertake a program of construction for the stack to be completed within a reasonable time.

SECTION 3 Compliance

Stack emissions of any source which are controlled in order to attain and maintain an ambient air quality standard or to prevent significant deterioration of the air quality, shall be accomplished through emission limitation alone. The degree of emission limitation so required of any source for control of any air pollutant shall not be affected by the remainder of that source's stack height that exceeds GEP or by any other dispersion technique, except as provided in Section 5.

SECTION 4 Public Notice

The District shall, after notice and opportunity for public hearing, require all stack heights to be demonstrated in a manner consistent with this regulation. A new or revised emission limitation that is based on GEP stack height that exceeds the stack height allowed by section 2.4.1, 2.4.2.1, 2.4.2.2 or 2.4.3 shall be required to provide an opportunity for public hearing on the emission limitation and shall make available to the District a copy of the demonstration study for public review.

SECTION 5 Exemptions

Stack heights in existence, or dispersion techniques implemented as part of a control strategy or permit review on or before December 31, 1970, or coal-fired steam electric generating units, which commenced operation before July 1, 1957, and whose stacks were constructed under a construction contract awarded before February 8, 1974, are exempt from this regulation.

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