



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

MAY 17 2011

OFFICE OF
AIR AND RADIATION

Mr. Robert Wagner
9005 N Chatham Avenue
Kansas City, Missouri 64154

Dear Mr. Wagner:

The U.S. Environmental Protection Agency (EPA) has completed its review of two petitions that you submitted requesting EPA action to address and regulate light as a pollutant. The first petition, dated October 9, 2008, asks EPA to consider light a new pollutant and to undertake a rulemaking to require states to address light pollution through the visibility and prevention of significant deterioration (PSD) programs. The second petition asks EPA to add anthropogenic light to the list of hazardous air pollutants pursuant to section 112(b)(3) of the Clean Air Act (CAA).

The EPA recognizes that artificial light can obscure the stars in the night sky for city dwellers, as well as interfere with scientific observations. We are also aware of studies that have found that some outdoor lighting can be harmful to human health and welfare. On the other hand, artificial light in many cases is essential to public safety and the protection of property. While light may be of concern in certain circumstances, EPA does not believe that the visibility or PSD provisions of the CAA provide a basis to regulate light.

The visibility and PSD programs can be found in Subchapter I, Part C of the CAA, 42 U.S.C. §§ 7470-7492. We have reviewed the visibility and PSD programs as well as the definition of "air pollutant" under the CAA in determining whether to grant or deny your first petition.

The visibility and PSD programs provide for the regulation of air pollutants, generally through state implementation plans, to protect visibility in Federal Class I areas and to prevent significant deterioration of air quality in "clean air" areas of the country. *See e.g.* 42 U.S.C. § 7491(a)(1) (Congress established as a national goal "the prevention of any future, and the remedying of any existing, impairment in visibility in mandatory Class I Federal areas which impairment results from manmade *air pollution*") (emphasis added); 42 U.S.C. § 7470(1) (the purposes of the PSD program are, *inter alia*, "to protect public health and welfare from any actual or potential adverse effect which...may reasonably be anticipate[d] to occur *from air pollution*...notwithstanding attainment and maintenance of all national ambient air quality standards) (emphasis added). EPA's starting point in considering your petition to regulate light under the visibility and PSD programs was to evaluate whether light should be categorized as an "air pollutant," as defined in the CAA.

The CAA defines “air pollutant” broadly as “any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive . . . *substance or matter* which is emitted into or otherwise enters the ambient air.” 42 U.S.C. § 7602(g) (*emphasis added*). Although “substance” and “matter” are not themselves defined in the CAA, a number of dictionaries offer the same or similar definitions of “matter;”

a. That which occupies space, can be perceived by one or more senses, and constitutes any physical body or the universe as a whole. b. *Physics*. Any entity displaying gravitation and inertia when at rest as well as when in motion.¹

a. The substance of which a physical object is composed. b. material substance that occupies space and has weight, that constitutes the observable universe, and that together with energy forms the basis of objective phenomena.²

The term “substance” is generally defined as synonymous with “matter.”³ Light does not occupy space, does not display gravitation and inertia and does not have weight. Based on the common understanding of “substance or matter,” as illustrated by the dictionary definitions of these terms, EPA has concluded that light is neither substance nor matter and, thus, does not clearly fall within the definition of “air pollutant.”

The EPA has also considered the expressed purposes and requirements of the visibility and PSD programs in considering your petition. Given the overall structure and provisions of the visibility and PSD programs, we believe it is reasonable to conclude that Congress did not intend for EPA to regulate light under these programs. As noted in the legislative history of the 1977 CAA Amendments, the purpose of the visibility program is to address the serious problem of emissions such as sulfur dioxide, oxides of nitrogen and particulate matter that “cast a pall in the atmosphere.” H.R. REP. NO. 294, 95th Cong. 1st Sess. 204-05 (1977). The requirements of the visibility and PSD programs are tied to emissions of such pollutants measured in tons per year, see *e.g.* 42 U.S.C. §§ 7474(a), 7479, 7491(b) & 7491(g)(7), a metric that could not be used to measure light. These programs focus on industrial sources such as power plants, cement plants, or iron and steel mill plants, sources that are not the most significant sources of excess light. For all these reasons, EPA does not consider it appropriate to regulate light as an “air pollutant” under the visibility and PSD programs.

We have also completed our review of your second petition asking EPA to add anthropogenic light to the list of hazardous air pollutants pursuant to section 112(b)(3) of the CAA. For much of the same reasons discussed above, EPA does not consider it appropriate to regulate light as a hazardous air pollutant. In short, light does not clearly fall within the definition of “air pollutant” and EPA does not consider it appropriate to treat light as a hazardous air pollutant given the overall structure and design of section 112 of the CAA. We note that before adding a substance to the list of hazardous air pollutants, it must be shown that the substance is an air pollutant. 42 U.S.C. §

¹ WEBSTER’S II NEW RIVERSIDE UNIVERSITY DICTIONARY (1988); THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE (1976).

² WEBSTER’S NINTH NEW COLLEGE DICTIONARY (1990).

³ See WEBSTER’S II NEW RIVERSIDE UNIVERSITY DICTIONARY; THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE.

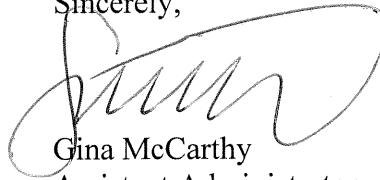
7412(b)(3)(B). In addition, it must be shown that emissions, ambient concentrations, bioaccumulation, or deposition of the substance are known to cause or may reasonably be anticipated to cause adverse effects to human health or adverse environmental effects. The petition, as submitted, fails to do so.

Nevertheless, we see other opportunities to reduce excess light, including:

- Following the guidelines in EPA’s Energy Star Building Upgrade Manual, found at http://www.energystar.gov/ia/business/EPA_BUM_Ful.pdf. The manual provides design guidelines for exterior lighting that both uses less energy and generates less glare. See Chapter 6.4 on “Lighting Design.”
- The National Park Service has a Night Sky Team, specifically created to address this problem. You may want to contact the team at <http://www.nature.nps.gov/air/lightscapes/team.cfm> to find out what they are doing to reduce light pollution.

Thank you for your concern for preservation of visibility of the night sky. I trust the information provided is helpful and appreciate the opportunity to be of service.

Sincerely,



Gina McCarthy
Assistant Administrator