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Subject: Information Quality Request (07 September 2004)

07 September 2004

Greetings,

Please promptly acknowledge receipt of this request.

This request for the prompt correction of significant and obvious errors in an EPA web site is pursuant to Section 515 of the Treasury and General Government Appropriations Act for FY2001 (Public Law 106-554; HR 5658).

Date of Request: 7 September 2004  
Contact name: Forrest M. Mims III  
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1. DESCRIPTION OF THE INFORMATION THAT DOES NOT COMPLY WITH THE OFFICE OF MANAGEMENT AND BUDGET AND EPA INFORMATION QUALITY GUIDELINES, INCLUDING SPECIFIC CITATIONS TO THE INFORMATION AND TO THE GUIDELINES.

The following EPA web site pages are among many that include erroneous and misleading scientific information:

<http://www.epa.gov/air/urbanair/ozone/index.html>  
<http://www.epa.gov/air/urbanair/nox/what.html>

2. EXPLANATION OF HOW THE INFORMATION DOES NOT COMPLY WITH THE INFORMATION QUALITY GUIDELINES.

OZONE (<http://www.epa.gov/air/urbanair/ozone/index.html>)

"Ground-level Ozone: What is it? Where does it come from? Ozone (O<sub>3</sub>) is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground level is created by a chemical reaction between oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOC) in the presence of heat and sunlight. Ozone has the same chemical structure whether it occurs miles above the earth or at ground level and can be "good" or "bad," depending on its location in the atmosphere. "Good" ozone occurs naturally in the stratosphere approximately 10 to 30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful rays. In the earth's lower atmosphere, ground-level ozone is considered "bad."

"VOC + NO<sub>x</sub> + Heat + Sunlight = Ozone. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NO<sub>x</sub> and VOC, that help to form ozone. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant. Many urban areas tend to have high levels of "bad" ozone, but even rural areas are also subject to increased ozone levels because wind carries ozone and pollutants that form it hundreds of miles away from their original sources."

ERRORS:

Leaving aside the highly simplistic description of ozone chemistry and other simplifications, these errors are of special concern:

> "Heat" is not necessary for the synthesis of ozone. Tropospheric ozone is produced by the photolysis by UV-A sunlight of NO<sub>2</sub> into NO and O, the O quickly combining with O<sub>2</sub> to yield O<sub>3</sub>. This reaction is only weakly associated with the temperature dependence of the NO<sub>2</sub> absorption coefficient. (See, for example, R. E. Shetter et al., Photolysis Frequency of NO<sub>2</sub>: Measurement and Modeling during the International Photolysis Frequency Measurement and Modeling Intercomparison (IPMMI) (Corrected September 9, 2002). Ozone concentrations are usually higher on warm summer days when the pressure is high and the air is stagnated. These conditions are often associated with an inversion layer, which caps the lower troposphere and allows ozone and other pollutants to increase. However, this phenomenon does not play a direct role in forming ozone.

> "Hot weather" causes a significant increase in the emission of biogenic VOCs from the foliage of vegetation. The emission of isoprenes from *Quercus virginiana* (live oak) is a notable example. The increase in emission can be exponential with temperature. The EPA statement above says nothing about this biogenic connection and the possible anthropogenic links with the urban heat island effect and the VOC emissions of agricultural and landscape plants. VOCs are an essential ingredient of ground-level ozone synthesis, and emissions of biogenic VOCs increase exponentially with temperature (to around 40 degrees C). Emissions of VOCs from asphalt increase with temperature, also.

> "Major sources" fails to include the very significant contribution of purely natural sources of NO<sub>x</sub>, VOCs and ground level ozone, including the natural background concentration and the role of episodic downward transport from the stratosphere.

> While transport of "hundreds of miles" is noted in the final sentence, there is no mention of transport of ozone and ozone precursors from sources in Asia thousands of miles away. Estimates of this contribution vary by season and range from 5 to 10 percent of background concentrations, enough to push many counties into nonattainment of the Clean Air Act's 8-hour ozone limit.

NITROGEN OXIDES (NO<sub>x</sub>) (<http://www.epa.gov/air/urbanair/nox/what.html>)

"NO<sub>x</sub>: What is it? Where does it come from? Nitrogen oxides, or NO<sub>x</sub>, is the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Many of the nitrogen oxides are colorless and odorless. However, one common pollutant, nitrogen dioxide (NO<sub>2</sub>) along with particles in the air can often be seen as a reddish-brown layer over many urban areas. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NO<sub>x</sub> are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels."

[Included is a prominent pie graph showing only anthropogenic sources of NO<sub>x</sub>.]

ERRORS:

> The text states, "The primary sources of NO<sub>x</sub> are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels." The pie chart shows only anthropogenic sources. Both the text and chart are deceptive, for natural sources of NO<sub>x</sub> are very significant. Yet they are not mentioned. For example, the contribution of soil microorganisms alone may be as significant as the sum of fossil fuel contributions.

Combustion of fossil fuels contributes 20-25 TgN yr<sup>-1</sup> (Delmas, R., D. Serça and C. Jambert, Global inventory of NO<sub>x</sub> sources, *Nutr. Cycling Agroecosys.*, 48, 51-60, 1997).

NO emitted by microorganisms in soil alone contributes from 9.7 TgN yr<sup>-1</sup> to 21 TgN yr<sup>-1</sup> (respectively,

Potter, C. S., P. A. Matson, P. M. Vitousek, and E. Davidson, Process modeling of controls on nitrogen trace gas emissions from soils worldwide, *J. Geophys. Res.*, 101, 1361-1377, 1996, and Davidson, E. A. and W. Kinglerlee, A global inventory of nitric oxide emissions from soils, *Nutr. Cycling Agroecosys.*, 48, 37-50, 1997).

> The text states, "Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process." The fact is that nitrogen oxides can be formed naturally, without the burning of fossil fuels. In addition to the production by soil microbes, nitrogen oxides are formed by lightning and other natural processes.

### 3. RECOMMENDATION FOR CORRECTIVE ACTION.

- > Promptly remove the erroneous statements and replace them with scientifically correct statements.
- > Find objective scientific peer reviewers to review and correct all EPA web pages.

### 4. EXPLANATION OF HOW THE ALLEGED ERROR AFFECTS OR HOW A CORRECTION WOULD BENEFIT THE SENDER.

> The EPA web sites contain numerous scientific and other errors, only two categories of which are presented here. Environmental science is among the largest categories of science fair projects in the United States. I have personally observed serious errors in science fair projects that were based on erroneous publications such as those described here. It is essential that the EPA promptly correct the errors described here and all other errors on its web sites that are used by students and the general public.

> EPA's reputation within the US and international scientific community, and by the general public, is diminished by the erroneous statements given above and at many other EPA web sites. This unprofessional approach to air quality science denigrates in the eyes of the public those of us who attempt to do high quality monitoring of the atmospheric environment. It also gives cause for citizens to ridicule the government that they support with their taxes.

> Title 18, Section 1001, of the US Code does not allow false writings or documents:

"(a) Except as otherwise provided in this section, whoever, in any matter within the jurisdiction of the executive, legislative, or judicial branch of the Government of the United States, knowingly and willfully -

"(1) falsifies, conceals, or covers up by any trick, scheme, or device a material fact;

"(2) makes any materially false, fictitious, or fraudulent statement or representation; or

"(3) makes or uses any false writing or document knowing the same to contain any materially false, fictitious, or fraudulent statement or entry;

shall be fined under this title or imprisoned not more than 5 years, or both."

The EPA requires the citizens and businesses it regulates to comply with a wide variety of environmental laws. Title 18 and other provisions of law apparently mandate that EPA correct all errors on its web sites. Correcting the errors described here, and on many other EPA web sites, will increase my personal confidence in the EPA in my role as an appointed member of two regional government air quality committees.

Disclaimer: Any errors in this request will be promptly corrected on receipt of notice.

Sincerely,

Forrest M. Mims III  
[www.forrestmims.org](http://www.forrestmims.org)