January 2010 Proposal to Revise the National Ambient Air Quality Standards for Ground-level Ozone

General Overview

Overview

- On January 6, 2010, EPA proposed revisions to the National Ambient Air Quality Standards (NAAQS) for ground-level ozone.
- The proposed revisions are based on scientific evidence about ozone and its effects on people and sensitive trees and plants.
- The proposed revisions would affect two types of ozone standards:
  - *Primary standard* to protect public health, including the health of at-risk populations such as children, people with asthma, and older adults.
  - *Secondary standard* to protect public welfare and the environment, including sensitive vegetation and ecosystems.
- Specifically, EPA is:
  - Proposing to revise the level of the *primary* 8-hour ozone standard to a level within the range of 0.060-0.070 parts per million (ppm).
  - Proposing to establish a separate cumulative *secondary* standard within a range of 7-15 ppm-hours.
- EPA is also proposing to update the Air Quality Index (AQI) for ozone.
- EPA plans to issue final standards by August 31, 2010.
- For more information go to http://www.epa.gov/ozonepollution

Regulating Ground-level Ozone Pollution

- The Clean Air Act requires EPA to set primary and secondary NAAQS for common air pollutants:
  - Ground-level ozone (smog)
  - Carbon monoxide
  - Nitrogen dioxide
  - Particulate matter
  - Lead
  - Sulfur dioxide
- The law requires EPA to review the scientific information and the standards for each pollutant every five years, and to obtain advice from the Clean Air Scientific Advisory Committee (CASAC) on each review.
- Different considerations apply to setting NAAQS than to achieving them
  - **Setting NAAQS:** health and environmental effects.
  - **Achieving NAAQS:** account for cost, technical feasibility, time needed to attain.
- EPA last reviewed and revised the ozone standards in 2008 and set both the primary and secondary standards at a level of 0.075 ppm.
- On Sept. 16, 2009, EPA announced it would reconsider this decision.

Reconsidering the Ground-Level Ozone Standards

- Today's proposal reconsiders the 2008 decision on the ground-level ozone standards based on the scientific and technical record used in the March 2008 review, which included more than 1,700 scientific studies.
- In this reconsideration, EPA is not relying on studies about the health and ecological effects of ozone that have been published since the science assessment to support the 2008 review was completed in 2006. However, EPA's Office of Research and Development conducted a provisional assessment of these newer studies and found they do not materially change the conclusions of the Agency's earlier science assessment.
- The proposed range is within the range recommended by CASAC.
  - The ozone standards set in 2008 were not as protective as recommended by EPA's panel of science advisors, the Clean Air Scientific Advisory Committee (CASAC).

Ozone NAAQS Reconsideration Schedule

- **Proposal** signed on January 6, 2010.
- **Public comment** period for 60 days after proposal is published in Federal Register.
- **Public hearings**
  - February 2, 2010 – Arlington, Va., and Houston, Texas.
  - February 4, 2010 – Sacramento, Calif.
- **Final Rule** signed by August 31, 2010.

Ground-level Ozone is:

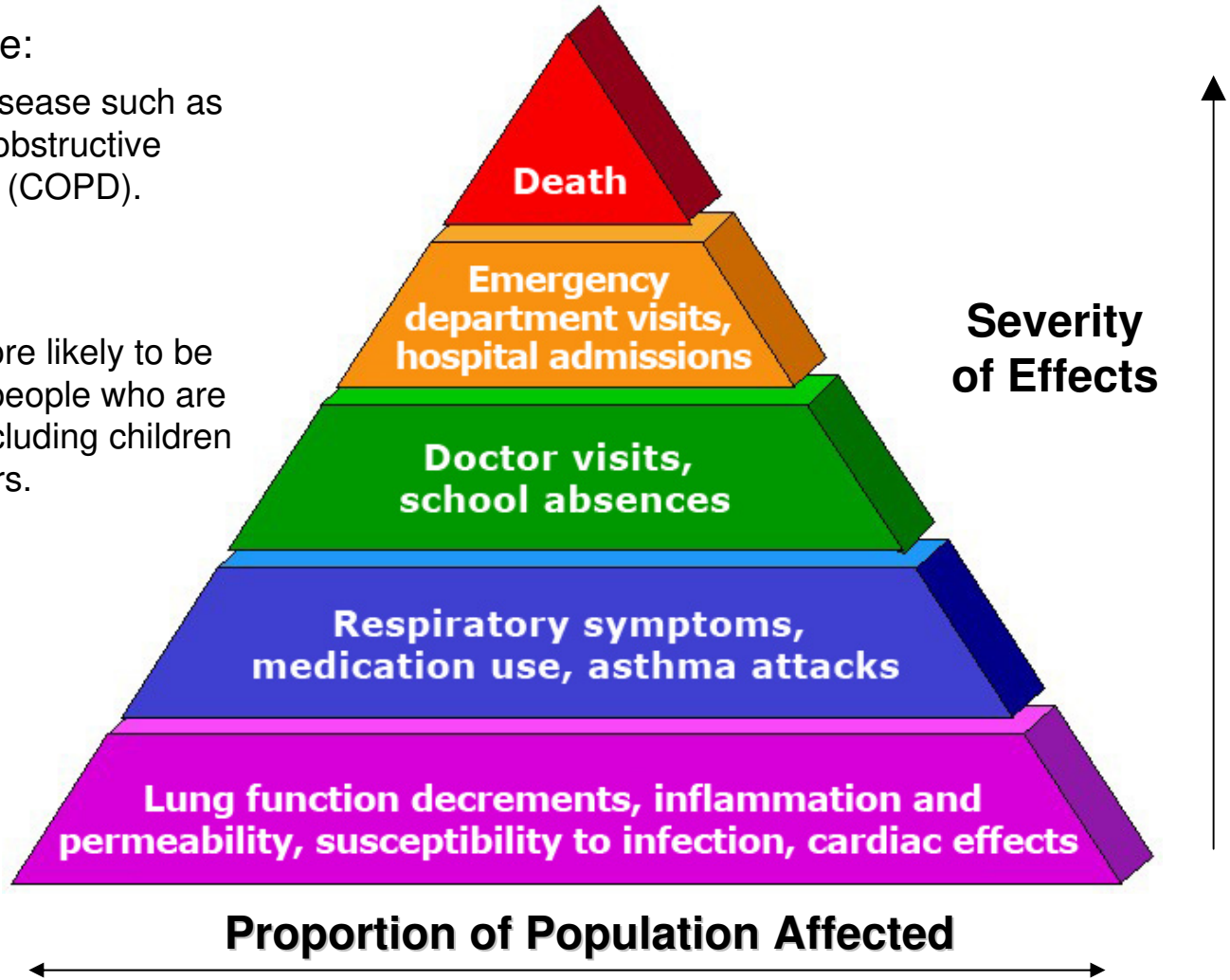
- The main component of smog.
- Not emitted directly into the air but forms when emissions of precursors, including nitrogen oxides (NOx), volatile organic compounds (VOCs), carbon monoxide (CO) and methane (CH_4), "cook" in the sun.
  - Emissions from industrial facilities, electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are the major man-made sources of NOx and VOCs.
- Mainly a summertime pollutant, because sunlight and hot weather accelerate its formation.
- Ozone levels can be high in both urban and rural areas, often due to transport of emissions of ozone precursors, especially NOx and VOC.

Ozone and Health

- Breathing ozone can:
  - Reduce lung function, making it more difficult for people to breathe as deeply and vigorously as normal,
  - Irritate the airways, causing coughing, sore or scratchy throat, pain when taking a deep breath and shortness of breath,
  - Inflame and damage the airways,
  - Increase frequency of asthma attacks,
  - Increase susceptibility to respiratory infection, and
  - Aggravate chronic lung diseases such as asthma, emphysema and bronchitis.
- These effects can lead to:
  - Increased medication use among asthmatics,
  - More frequent doctors visits,
  - School absences,
  - Increased emergency room visits and hospital admissions, and
  - Increased risk of premature death in people with heart and lung disease.
- Children are at increased risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors.

Ozone Health Impacts: "Pyramid of Effects"

- At-risk groups include:
  - People with lung disease such as asthma or chronic obstructive pulmonary disease (COPD).
  - Children.
  - Older adults.
  - People who are more likely to be exposed, such as people who are active outdoors, including children and outdoor workers.



Ozone and the Environment

- Ground-level ozone is absorbed by the leaves of plants, where it can:
  - Interfere with the ability of sensitive plants to produce and store food.
    - This can lead to reduced growth, biomass production and yields.
  - Make sensitive plants more susceptible to certain diseases, insects, harsh weather, other pollutants, and competition.
  - Reduce or change plant species diversity in associated ecosystems.
    - This can lead to damage to ecosystems dependent on those species.
  - Visibly injure the leaves of plants, affecting the appearance of vegetation in national parks, recreation areas and cities.

Proposed Revisions to Primary Ozone Standard

- EPA is proposing to strengthen the level of the 8-hour primary ozone standard to a level within the range of 0.060-0.070 parts per million (ppm).
- The proposal to set a primary standard within this range places additional weight on key pieces of scientific evidence, including:
  - evidence from clinical studies showing effects in healthy adults at 0.060 ppm, including decreased lung function and respiratory symptoms;
  - evidence from clinical and epidemiological studies indicating that people with asthma are likely to experience larger and more serious effects than healthy people;
  - epidemiological evidence indicating associations for a wide range of serious health effects, including respiratory-related emergency department visits and hospital admissions and premature mortality, that extend below the current standard level of 0.075 ppm; and
  - estimates from the risk and exposure assessment indicating that important improvements in public health could be achieved by a standard more stringent than 0.075 ppm.

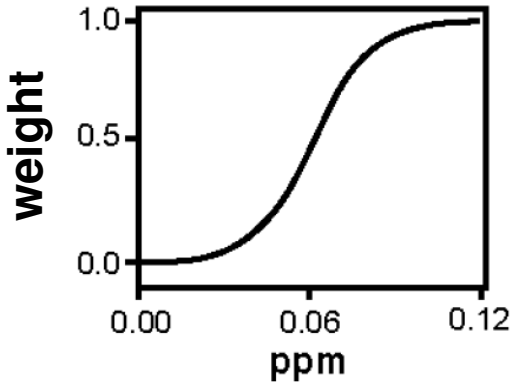
Proposed Revisions to Secondary Ozone Standard

- EPA is proposing to establish a distinct cumulative, seasonal secondary standard at a level in the range of 7-15 ppm-hours.
  - This cumulative standard would add weighted hourly ozone concentrations across all days in a three-month period.
- The Administrator proposes that a seasonal secondary standard identical to the primary standard, as was set in 2008, is inadequate to provide the requisite level of protection for vegetation and ecosystems.
- The new secondary standard, also called W126, is designed to account for the cumulative effects of repeated ozone exposures on sensitive vegetation during the three months of the year when ozone concentrations are highest.

Understanding the W126 Proposed Secondary Standard

Steps in calculating W126 value for a particular site:

1. Measure hourly ozone (O_3) concentrations for each hour within the 12 hour daylight period (8am-8pm).
2. Assign a weight to each hourly value based on concentration: lower concentrations receive less weight than higher concentrations.
3. Sum the 12 weighted hourly values to calculate a daily W126 value.
4. Repeat steps 1-3 for each day within the ozone season and then sum the daily values to calculate the monthly W126 value.
5. Identify the consecutive 3-month period whose monthly W126 values produce the highest total. This total becomes the seasonal W126 for this site.
6. Average three years of maximum W126 values and compare to standard.



Example of weighting over 5-hour period:

Hourly O_3 (ppm)	Weight	W126 (ppm-hrs)
0.03	0.01	0.00
0.05	0.11	0.01
0.06	0.30	0.02
0.08	0.84	0.07
0.10	1.0	0.10
	SUM:	0.20

Daily value =
Sum of values over 12 daylight hours

Implementation Considerations For Proposed Ozone Standards

- **Designations**
  - The Clean Air Act requires States and gives Tribes the option to recommend to EPA which areas are and which areas are not meeting the new standards
  - EPA is proposing an accelerated schedule for designating areas for the primary ozone standard.
  - EPA is taking comment on whether to designate areas for a seasonal secondary standard on an accelerated schedule or a 2-year schedule.
  - EPA is reviewing existing designations guidance and will be communicating with States and Tribes if additional guidance is needed.
- **Previous Ozone Standards**
  - The 2008 8-hour ozone NAAQS and the 1997 8-hour ozone NAAQS remain in place.
  - Implementation for the 2008 8-hour ozone NAAQS is delayed during the reconsideration.
    - Today, EPA announced it is extending the deadline for area designations for the 2008 ozone standards by one year (until 2011).
    - If EPA issues different ozone standards in 2010, these standards would replace the 2008 ozone standards. Implementation requirements for the 2008 ozone standards, including designations, would no longer apply.
  - States should continue their plans for implementing the 1997 NAAQS.

Proposed Accelerated Implementation Timeline

Milestone	Date
Signature—Final Rule	August 31, 2010
State Designation Recommendations to EPA	January 2011
Final Designations	Effective no later than August 2011
Attainment Demonstration SIPs Due	December 2013
Attainment Dates	2014-2031 (depends on severity of problem)

- EPA is planning to propose an implementation rule in spring 2010 and issue a final rule as quickly as possible after the final ozone NAAQS.

Monitoring Considerations Related to Proposed Ozone Standards

- In a separate rule, EPA proposed in July 2009 modifications to the ozone air quality monitoring network design requirements. The proposed modifications would better support alternative ozone standards, including the 2008 ozone standards and the standards proposed in this reconsideration.
  - EPA is not proposing to modify the monitoring requirements for ozone in this reconsideration.
- The already proposed monitoring revisions would modify minimum monitoring requirements in urban areas, add new minimum monitoring requirements in non-urban areas, and extend the length of the required ozone monitoring season in many states.
- There are approximately 1,200 ozone monitors operating in the United States, with about 1,000 sited to represent urban areas and 200 to represent non-urban areas.
  - EPA estimates that about 270 new ozone monitors could be required to satisfy the proposed monitoring requirements.
- EPA is considering comments received on the proposed monitoring requirements and expects to issue a final rule in late summer 2010.

Supplement to the Regulatory Impact Analysis

- EPA conducted a supplement to the Regulatory Impact Analysis (RIA) to complement the analyses done for the ozone standards set in 2008.
  - EPA conducts an RIA to analyze the benefits and costs of reducing pollution to meet alternative ozone standards. An RIA is required by Executive Order 12866 and guidance from the White House Office of Management and Budget.
- The benefit and cost analysis is not considered in selecting the proposed ozone standards.
  - The Clean Air Act bars EPA from considering costs in setting or revising any NAAQS.
- The supplement to the RIA is an illustrative analysis and provides information regarding example control strategies, air quality impacts and public health improvements.
- EPA estimates the value of health benefits of reducing ozone to 0.070 ppm would range from about $13 billion to $37 billion per year in 2020. For a standard of 0.060 ppm, the value of benefits would range from about $35 billion to $100 billion per year in 2020.
- The costs of reducing ozone to 0.070 ppm would range from an estimated $19 billion to $25 billion per year in 2020. For a standard of 0.060 ppm, the costs would range from $52 billion to $90 billion.
  - The supplement to the RIA assumes that the proposed standards can be achieved throughout the U.S. using a mixture of known air pollution control technologies and unknown, future technologies.
  - The annual control technology costs of implementing known controls as part of a strategy to attain a standard in the proposed range of 0.060 ppm or 0.070 ppm in 2020 would be approximately $3.3 billion to $4.5 billion. EPA used several statistical methods to provide a range of likely compliance costs for other, currently unknown technologies that would be needed to attain the proposed primary standards.
- The supplement to the RIA includes a limited, qualitative analysis of meeting a secondary standard in the proposed range.

Estimated Number of Adverse Health Effects Avoided under Alternate Standard Levels in 2020*

	0.070 parts per million	0.060 parts per million
Chronic bronchitis	880	2,200
Nonfatal heart attacks	2,200	5,300
Hospital and emergency room visits	6,700	21,000
Acute bronchitis	2,100	5,300
Upper and lower respiratory symptoms	44,000	111,000
Aggravated asthma	23,000	58,000
Days when people miss work or school	770,000	2.5 million
Days when people must restrict their activities	2.6 million	8.1 million
Avoided premature mortality	1,500 to 4,300	4,000 to 12,000

*Includes benefits of reduced fine particle concentrations associated with illustrative ozone controls applied to meet a primary ozone standard in the proposed range