Catalytic Products INTERNATIONAL

EPA OZONE STANDARDS

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980 Ensell Road | Lake Zurich, Illinois 60047 | office: 847.438.0334 | fax: 847.438.0944
e-mail: info@cpilink.com | website: www.cpilink.com

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Introduction

Staying Ahead of the New Ozone Standards

VOCs are pre-cursors of ground level ozone or smog. Ground level ozone is created by the reaction of VOCs with NOx in the presence of sunlight. Ozone has the same chemical structure whether it occurs miles above the earth or a ground-level and can be "good" or "bad" depending on its location in the atmosphere.

The U.S. Environmental Protection Agency (EPA) is preparing to again lower its ozone standard.

This action reduces the amount of ozone that is allowed in the air we breathe and thus forces more industrial sources to further reduce their air pollution emissions.

In this white paper we look at:

What will happen when the new ozone standard is finalized; and
Ways to deal with new requirements in a cost-effective manner.

980 Ensell Road | Lake Zurich, Illinois 60047 | office: 847.438.0334 | fax: 847.438.0944
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Background

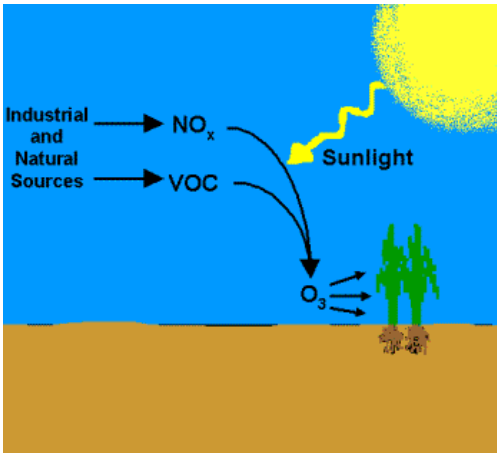
What does this mean to industry? More regulations, tighter control requirements and more aggressive, more demanding regulatory authorities.

While ozone is a good thing when it's high up in the atmosphere, where it protects us from harmful solar radiation, it's not nearly as desirable at ground level in the air we breathe.

Too much ground level ozone (sometimes called "smog") can contribute to breathing problems, particularly among the very young, the very old, and people with respiratory disease such as asthma and COPD.

As part of its duties the Clean Air Act, EPA is charged with managing ozone in the air we breathe.

VOC's + NOx + SUN = Ozone or Smog
So by limiting VOC or NOx, Ozone is reduced



Ozone is formed as the result of the reaction of two common air pollutants:

1. Nitrogen oxides (NOx)
2. Volatile organic compounds (VOCs)

The most significant sources of NOx are power plants and motor vehicles. While EPA will take further action regarding those emissions, we will not cover that part of the equation. Instead, we will focus on VOC's, because a wide variety of manufacturers and other industrial sources are most affected by new VOC regulations whenever the ozone standard is lowered.

In 2010, EPA first announced its intention to lower the ozone standard from the current value of 75 parts per billion to at least 70 and perhaps as low as 60 parts per billion. Political backlash resulted in a postponement of the action. However, the Agency appears to preparing to revisit the ozone standard once again.

If the ozone standard is reduced hundreds of counties* across the nation that were previously in compliance with clean air standards no longer will be and hundreds of other counties will be farther than ever from meeting clean air goals.

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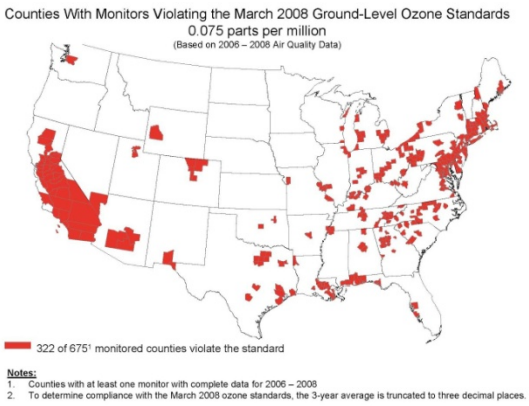
The Process

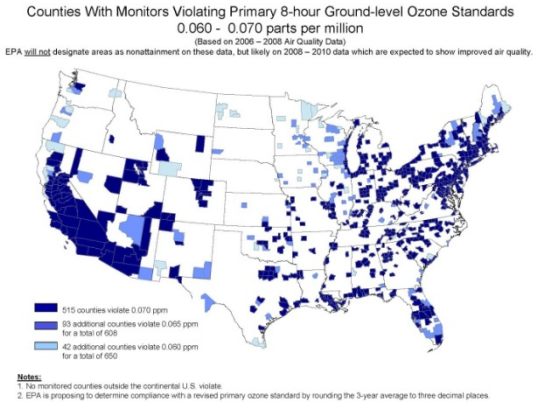
Setting a new standard is step one in the regulatory process

Once that standard is approved, state and local environmental regulatory authorities must come up with a plan to meet the new clean air goal.

***US Counties that violate the current ozone standards**



****US counties that are affected by the proposed lower ozone standards**



Each state will inventory all of the sources that contribute to ozone formation. Then they will look at different kinds of sources to determine where reductions can be achieved.

Some of these reductions involve motor vehicles. Using low vapor-pressure gasoline and implementing mandatory vehicle inspection programs can provide some of the required VOC reductions, for example. But, inevitably, VOC reductions involve industry as well.

When a county meets clean air standards, it is said to be in "attainment" with those standards. In an "attainment area" smaller industrial sources of air pollution emissions aren't usually subject to strict emission control requirements. As long as a plant emits less than 250 tons of VOC's per year in an attainment area few, if any, emissions controls are required.

When a county no longer meets clean air standards, even if the only reason is that the standards have changed, businesses are affected.**

Once EPA sets a new ozone standard, the states will begin developing their control strategies. New rules require many more sources to install and maintain controls.

For example, a plant that emitted 200 tons of VOC per year without having to use control can suddenly find the rules no longer allow it to emit even 100 tons of VOC per year.

In counties that were already designated non-attainment*, the regulatory authority will tighten down the regulations even further because more reductions will be needed to meet the new clean air goal.

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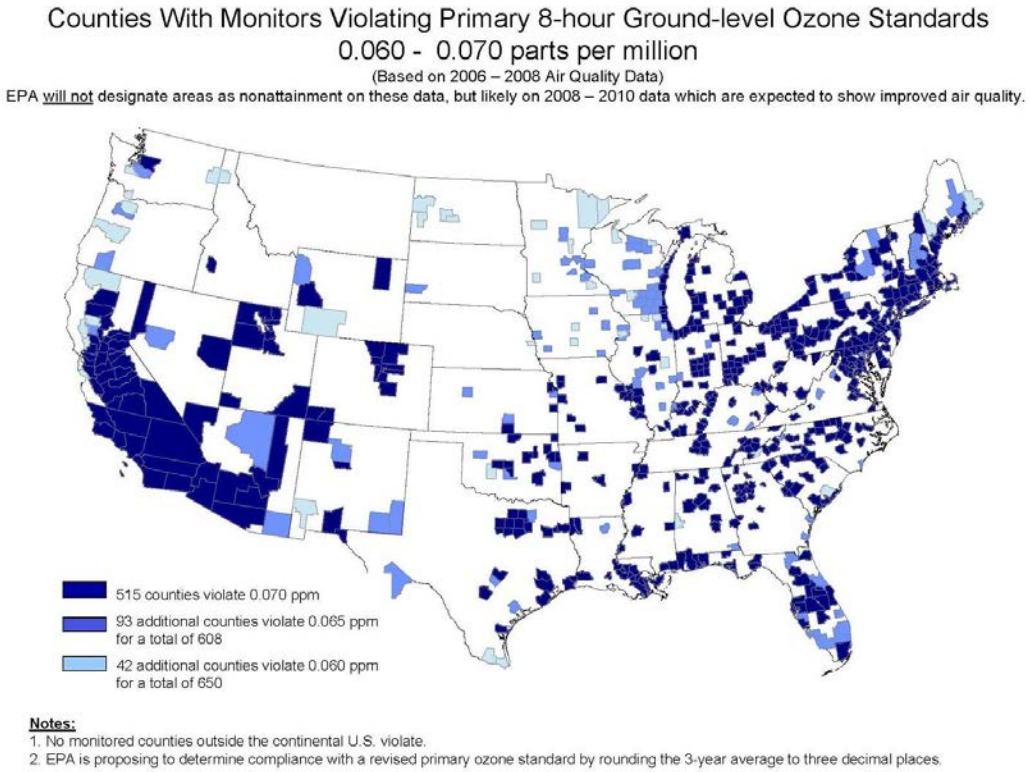
Scope and Timeline

According to EPA, air quality monitors are currently used to measure ozone in 675 counties across the nation. (Monitors are not usually installed in counties that are largely rural or wilderness, because it is assumed to have little effect on human activities).

Of these 675 counties, 322 do not meet current ozone standard.

- If EPA chooses 70 parts per billion as the new standard, 515 counties won't meet it.
- If EPA chooses 65 parts per billion as the new standard, 608 counties won't meet it.
- If EPA goes as low as 60 parts per billion, 650 counties won't meet the new standard.



If a new standard is adopted, each state or local regulatory authority has to decide which counties will be designated as being in non-attainment with the new ozone standard approximately two years after the new standard is adopted.

About a year after that, the states must come up with plans to turn their non-attainment areas into attainment areas by reducing emissions. About another year later, EPA will approve state plans, and the new round of reductions will begin.

Decision Points

When planning to deal with new ozone standards, each source of VOC emissions must first decide whether it will be – and wants to be – designated as a *major source* in the new regulatory scheme.

The distinction is important. As previously noted, most plants can remain minor sources in attainment areas if they emit less than 250 tons per year of VOC's and are thus not subject to strict control requirements.

Re-designation as a non- attainment area can mean plants that emit as little as 100 tons per year, or even 50 tons per year in some cases, will become major sources.

The decision whether or not to be a major source under a new regulatory scheme is ultimately a business decision, involving a cost/benefits analysis. Catalytic Products International has always provided potential customers this sort of economic analysis. Indeed, part of the service involves letting potential customers know when buying a control device to comply with regulatory requirements clearly doesn't make economical sense. Defining the real capital and operating costs involved with installing and maintaining controls is a vital part of the decision-making process.

As a major source, a facility is subject to much more strict control requirements, more official attention and far greater penalties in the case of a violation of applicable regulations. It is therefore beneficial to some facilities to reduce their emission to below major source thresholds before new requirements kick in. Sources that ultimately find themselves subject to new control requirements are then **faced with two equally-important decisions:**

- Collecting VOC emissions so they can be delivered to a control device. Sometimes, this means designing effective hoods and other forms of capture that minimize fugitive emissions with inhibiting production.
- Permanent Total Enclosures that collect 100 percent of all VOC emissions are more desirable. The best solution is unique to each plant and depends on the production and business needs of the facility in questions.

The choice and design of the "end of pipe" control device is equally important. The ideal control device must be energy efficient, reliable, and flexible. Every application is unique and the choice of a control device should reflect the best solution to the facility's particular needs.

There are many different types of air pollution control equipment on the market today that aid manufacturing and production facilities to meet government mandated emission levels.

When companies research which type of equipment to install in their facilities, they often look at factors such as destruction efficiency, capital cost, operating cost, and equipment footprint. What is often not researched are the characteristics of their airstream and the effect this has on the end of pipe control.

Detailed information about the process airstream is critical to selecting the proper size and type of control equipment.

Factors that need to be defined include:

- Constituents that make up the process air stream: Organic and inorganic compounds.
- Volume ranges (high and low) of target exhaust stream
- Characteristics of the process air – Does it contain condensable gases? Are there inorganic elements that will not be destroyed? Are there organic solids? What is the moisture content of the air? Are there acid forming constituents, requiring additional controls or special design consideration?
- Energy value of the airstream and how safety considerations play a role in equipment design.
- Are there heat recovery opportunities? This will become a big part of design in the future as green house gas reduction becomes more important.

By clearly defining the target exhaust stream in the beginning of the process, the proper control equipment and auxiliaries can easily be selected.

To further understand the importance of defining the airstream, we will look at how the different types of end of pipe control equipment choices may offer benefits or may have limitations.

Catalytic Oxidizers:

- Well suited for target air streams less than 25,000 scfm and ranging in VOC concentrations less than 20 percent LEL. High removal efficiency and low operating costs can be expected. No moving parts and very easy maintenance.
- Uses a precious metal catalyst with typical life expectancy of five to ten years. Subject to poisons such as heavy metals, silicones, and halogens.

Regenerative Thermal Oxidizers (RTO's):

- Well suited for target air streams from 5,000 to 80,000 scfm and ranging in VOC concentrations of less than seven percent LEL (or less than 20 percent LEL with appropriate add-on equipment). High removal efficiency and low operating costs can be expected.
- Large footprint that can require substantial area for installation. Heavy equipment weights that typically prevent roof-top installations. Sensitive to particulate and condensable organics. Limited heat recovery choices, as the RTO is very thermally efficient.

Thermal (recuperative) Oxidizers:

- Well suited for target air streams up to 50,000 scfm. Ideally suited for high VOC concentrations and can easily accommodate up to 50 percent LEL. Very high removal efficiency. Well suited for particulate and condensable organics. Easily designed for acid bearing air streams. Many heat recovery choices are available to consider.
- Limited thermal rate efficiency and offers low operating costs only when VOC loads are sufficiently high.

Resources

Implementing the new ozone standard and new control rules that result from it are public processes.

- You can track the progress of the new ozone standard proposal at the EPA website

http://www.epa.gov/air/ozonepollution/actions.html#desig

Some industries can also get a glimpse of what new control requirements are likely to look like by examining EPA Control Techniques Guidelines (CTGs). EPA publishes CTG's for a number of industry sectors and these documents typically form the basis for new rules that states develop.

- You can find EPA current CTGs by following

http://www.epa.gov/ttn/caaa/t1ctg.html

Catalytic Products International is also a resource you can count on as you prepare to manage this new round of regulation in a way that makes sense for your business. We have decades of experience in designing control strategies that make the most sense for your bottom line. As EPA prepares to demand more than ever from industry, cost effective, reliable solutions to today's environmental challenges are more important than ever.

- You can check CPI's **Environmental NEWS Portal** weekly to see the latest trending in the air pollution control world

http://www.cpilink.com/environmentalnewsportal

Catalytic Products International is a worldwide leader in the design and manufacturing of customer air pollution control systems, offering all types of VOC systems while providing un-biased evaluations discussing the pros and cons of each.

- Further assistance may be found by consulting Catalytic Products International

847.438.0334

info@cpilink.com