

Reactivity-Based Regulatory Approaches

Federal Perspective

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Overview

- Review of EPA's 2005 Interim Guidance
- Aerosol Coatings Reactivity Rule
- Emerging Issues -- Reactivity Applications

EPA's 2005 Interim Guidance

- Encouraged States to consider recent scientific information on reactivity in development of state implementation plans (SIPs)
- Summarized recent scientific findings
- Provided examples of reactivity applications
- Clarified the relationship between reactivity-based policies and EPA's definition of VOC

Where can Reactivity Best be Used?

- Targeting higher reactive compounds can in some cases be more effective and efficient than traditional mass-based approaches, especially in:
 - Areas with persistent ozone problems
 - Urbanized or other NO_x-rich (VOC-limited) areas
 - Areas already having made significant VOC reductions that need further ozone reductions

How can Reactivity be Used in SIP Development?

- Developing accurate, speciated emissions inventories
- Prioritizing control measures using reactivity metrics (control most reactive source categories first)
- Targeting highly reactive VOCs with specific control measures (e.g. Houston-Galveston area measures)
- Encouraging VOC substitution via reactivity-weighted emission limits (e.g., CARB aerosol coatings rule)

Reactivity and the Existing Exemption Policy

- Although a reactivity scale approach may be the most effective choice in some cases, it is more difficult to develop and implement than mass-based approaches
- EPA continues to believe that the use of mass-based regulations that encourage substitution to “VOC-exempt” compounds is an effective control strategy in many areas

Exemption Criteria

- EPA's approach is to compare candidate compounds to ethane using
 - k_{OH} expressed on a molar basis, or
 - Maximum incremental reactivity (MIR) values expressed on a mass basis
- EPA may consider other criteria (e.g. from airshed modeling) if provided with adequate justification

Non-Ozone Environmental Effects of Exempt Compounds

- Exemption policy is intended to facilitate attainment of the ozone NAAQS
- Exempt compounds may have other environmental effects unrelated to ozone
 - PM formation
 - Air toxics exposures
 - Stratospheric ozone depletion
 - Climate change
- EPA believes other programs are specifically designed to address some of these issues

Reactivity Research Working Group

- RRWG's efforts significantly improved our understanding of VOC reactivity scales and related issues
- Supporting reactivity-based approaches will require an ongoing research program
- Hurdles to overcome:
 - Resources
 - Leadership/Structure

The Interim Guidance's Message

- “EPA encourages States, particularly those with persistent ozone nonattainment problems, to consider recent scientific information on VOC reactivity and how it may be incorporated into the development of ozone control measures.”
- “Although most existing VOC control programs do not discriminate between individual VOCs based on reactivity, they continue to provide significant ozone reduction benefits and will remain in place unless and until they are replaced by programs that achieve the same or greater benefits.”

EPA's Aerosol Coatings Reactivity Rule

- On July 16, 2007, EPA proposed national emission standards for aerosol coatings (72 FR 38952) based on the CARB reactivity-based rule
- EPA has proposed that a reactivity-based approach is the best solution for the aerosol coatings category
 - There are practical limitations to the mass of VOC that can be removed from aerosol coatings
 - Maximum mass reductions have already been achieved in most aerosol coating categories
 - Further ozone formation reductions can be achieved through a reactivity-based approach

Proposed Aerosol Coatings Rule

Considerations During Rule Development

- Is the maximum incremental reactivity (MIR) scale appropriate for use nationwide?
- Does the rule represent “best available controls” (BAC) as required under Section 183(e)?
- How do we deal with toxics and ozone depleters? (CARB rule prohibits use of certain compounds)
- How do we calculate mass VOC reduction credit for States to claim in rate of progress demonstrations?
- What recordkeeping and reporting are needed to monitor changes in the composition of emissions?

Proposed Aerosol Coatings Rule

Aerosol Coatings Contact

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Emerging Issues

- Industry has asked that CARB incorporate reactivity into their revised suggested control measure (SCM) for architectural and industrial maintenance (AIM) coatings
 - A reactivity-based innovative product exemption (IPE) would exempt a product from the VOC mass limit if the manufacturer demonstrates that, based on the reactivity of the formulation, the product is expected to contribute to formation of no more ozone than a representative “complying” product
- Industry has also asked EPA whether reactivity has a future role in our consumer products (CP) and AIM rules

Emerging Issues

IPEs – Mass vs. Reactivity

- The CP rule concept of the mass-based IPE (considering delivery method, valve design, etc., of packaged products) cannot be adapted easily to cans of paint
- In principle, reactivity IPEs are intended to achieve the same results as mass-based IPEs – less ozone formation from use of the product
- However, introduction of reactivity into the IPE concept may be more complicated due to
 - Lack of speciated content data for existing products
 - Difficulty in identifying a “representative” complying product
 - Verification and enforcement issues

Reactivity IPEs – EPA Perspective

- EPA strongly encourages innovation and supports existing provisions for mass-based IPEs in CP rules
- Consistent with our 2005 interim guidance, EPA encourages the States to consider the use of reactivity-based measures, including IPEs, to the extent they determine that these measures are appropriate, based on the individual situations and requirements of the States
- EPA does not plan to incorporate reactivity into its current amendments of the Federal CP and AIM rules
 - EPA amendments in progress are based on mass VOC limits previously adopted in CA for AIM (2000 SCM) and CP (CONS-1) which have been demonstrated to be achievable
 - However, in the future, as the need for further ozone reduction drives mass limits lower and lower, EPA will consider whether reactivity approaches have merit in specific applications, including IPEs for AIM and CP

The SIP Process

- States generally have the primary obligation to develop SIP control measures to achieve the NAAQS
- EPA's role is to review SIP submissions and approve them if appropriate
- States may choose to develop either mass-based or reactivity-based control measures; EPA will review these measures on a case-by-case basis for inclusion in a State's SIP

For Consumer and Commercial Products . . .

- In the case of products under CAA section 183(e), EPA will also assist States by issuance of either national rules or guidance documents
- States are not preempted under CAA section 183(e) and may seek to develop their own State regulations; EPA will review these on a case-by-case basis for inclusion in a State's SIP

The Bottom Line

- Reactivity-based approaches are inherently more complicated than mass-based approaches, but . . .
- Reactivity might be appropriate where it can be determined to be the better approach

Contacts

Federal Measures Issues

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SIP and VOC Definition Issues

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