

Candidate Control Measures for Industrial Solvent Cleaning (Degreasing)



Regional Air Quality Workshop

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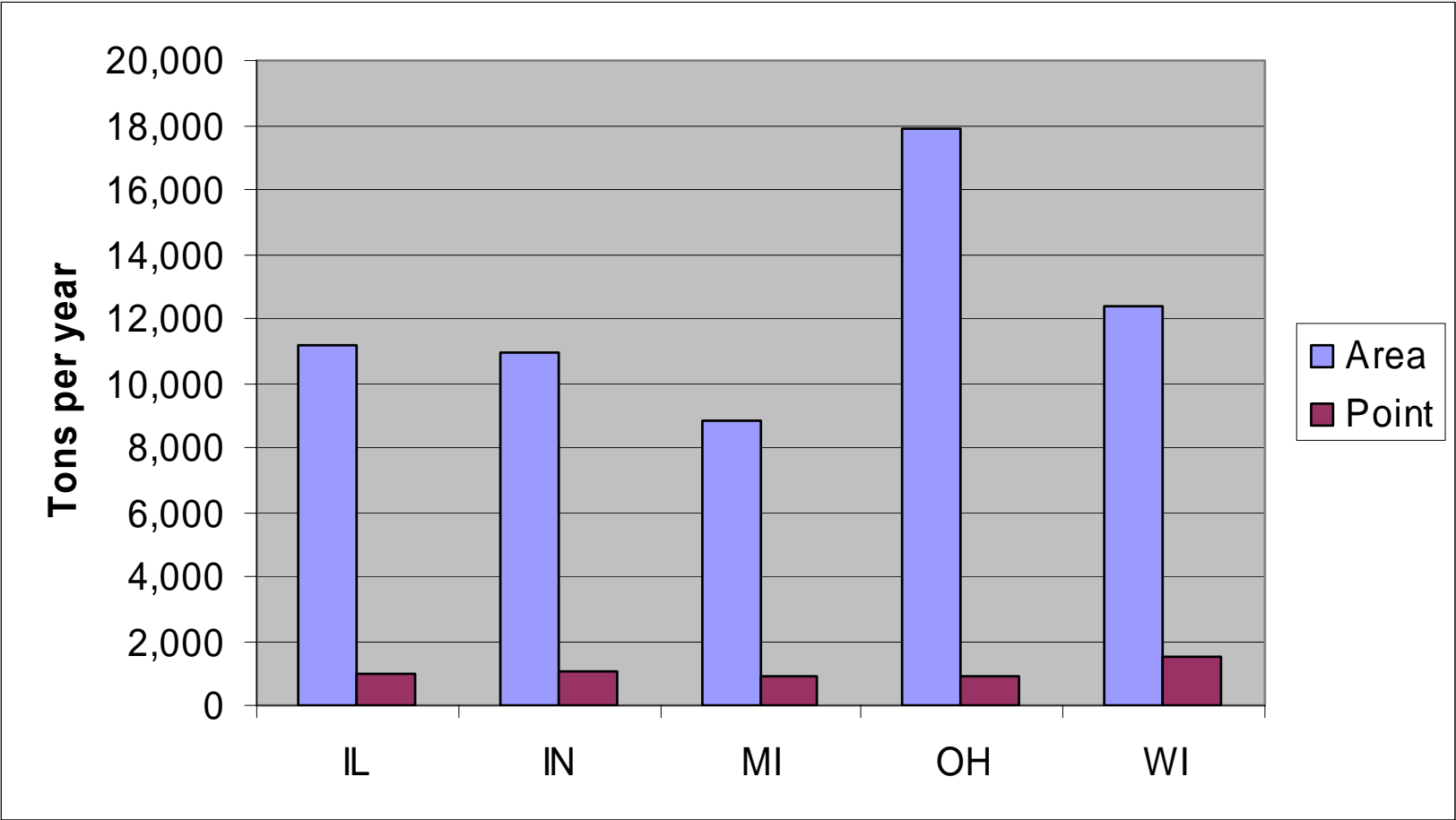
Category Description: Industrial Solvent Cleaning

- Integral part of many industries
- **Batch cold cleaning machines**
 - use solvent at ambient temperatures
 - typically used in automobile repair and maintenance facilities, and in industrial maintenance shops.
- **Vapor cleaning machines**
 - Batch open top vapor degreasers heat the solvent to create a vapor zone where cleaning occurs
 - Conveyorized degreasers use a continuous process to clean metal parts using either cold or vaporized solvents
 - Typically used in manufacturing operations include the electronics industry and high quality metal machining and finishing operations
- **Manual processes**
 - Wiping using mops, brushes, and rags
 - Spraying
 - Flushing the interiors of equipment
 - Dipping small parts in vessels of solvents

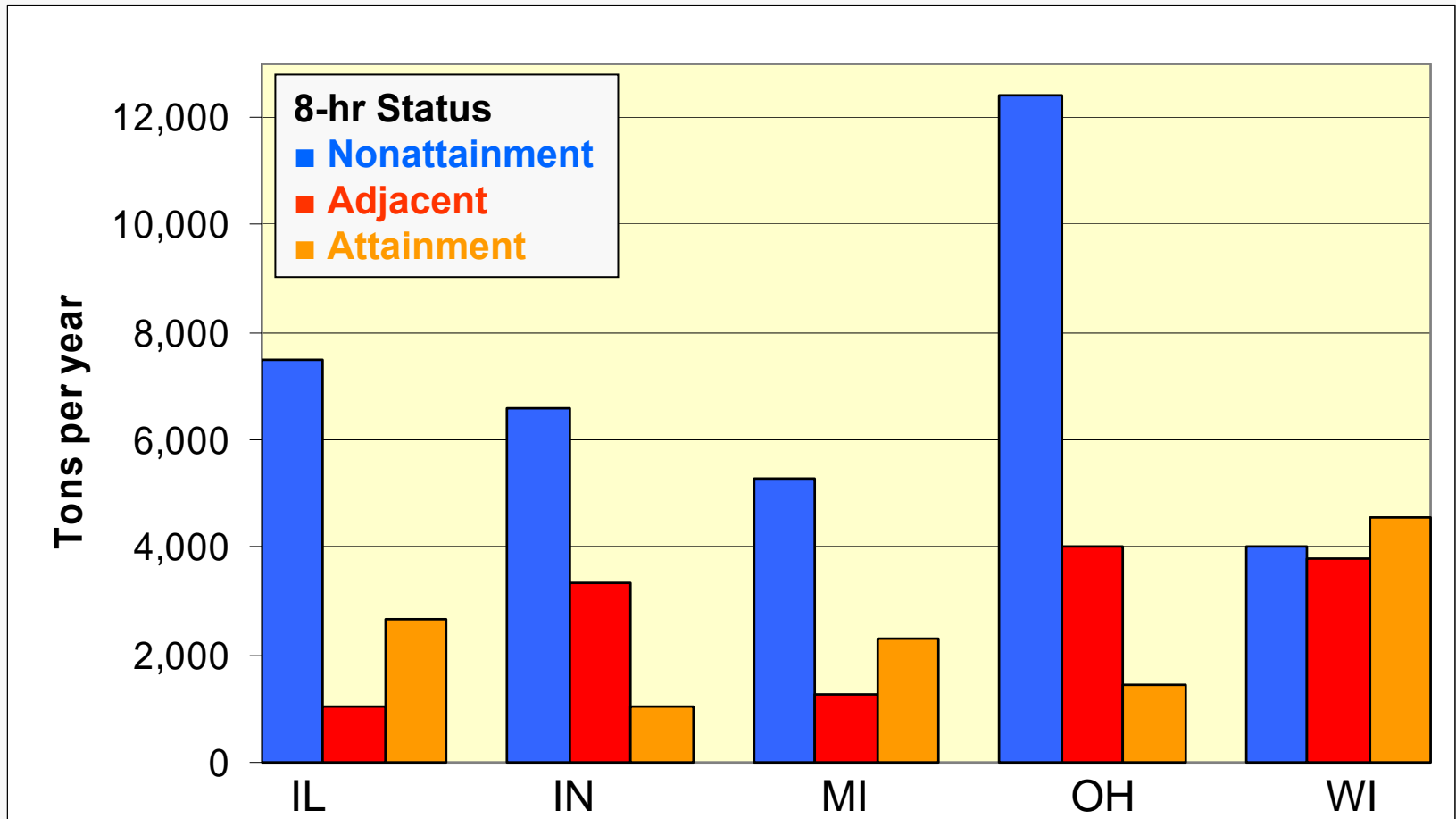
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- VOC emissions result from:
 - evaporation are from storage and handling of fresh and spent solvents
 - solvent evaporation from the cleaned surfaces
 - evaporation as the solvent is splashed or sprayed
 - fugitive emissions from flushing or spray systems
 - evaporation from solvent-soaked rags or cleaning tools.
 - All solvent not recycled or sent to waste disposal is eventually emitted into the atmosphere
- Accounts for about 3 percent of the total anthropogenic VOC emissions in the MRPO region in 2002
 - Area sources are substantial, but estimates are uncertain
 - methodology relies on per employee emission factors and employment data or per capita emission factors.
 - Per capita or per employee emission factors 1980s era data
 - May not be representative of the types of cleaning solvents, waste solvent disposal practices, and control technologies currently used

VOC Emissions By Degreasing Category



VOC Emissions from Degreasing By 8-hr Ozone Status



Regulatory History: Degreasing Federal Rule

- Control Technology Guideline (CTG) for solvent metal cleaning in November 1977
 - Addressed cold cleaning, vapor top degreasing, and conveyORIZED degreasing
 - Use of control equipment (e.g., covers, increased freeboard ratio)
 - Work practices (e.g., unit closed when not in use, waste solvent managed in covered containers)
- MACT for Halogenated Solvent Cleaners published in December 1994
 - Regulates the use of six chlorinated solvents, one of which is a VOC
 - VOC reductions from the MACT standard are thought to be minimal to negligible

Regulatory History: Degreasing Non-MRPO State Rules

- SCAQMD Rule 1122
 - Originally adopted in 1979, since modified
 - Use of low-VOC content solvents
 - More stringent than CTG operating practices
- Ozone Transport Commission (OTC) Model Rule
 - Requirements are based on MACT standard
 - Hardware and operating requirements for specified vapor cleaning machines
 - Solvent volatility limits and operating practices for cold cleaners
 - Incremental control effectiveness of 66%
 - Primarily affects small business and solvent suppliers
 - Model (or similar) rules adopted in all OTC states

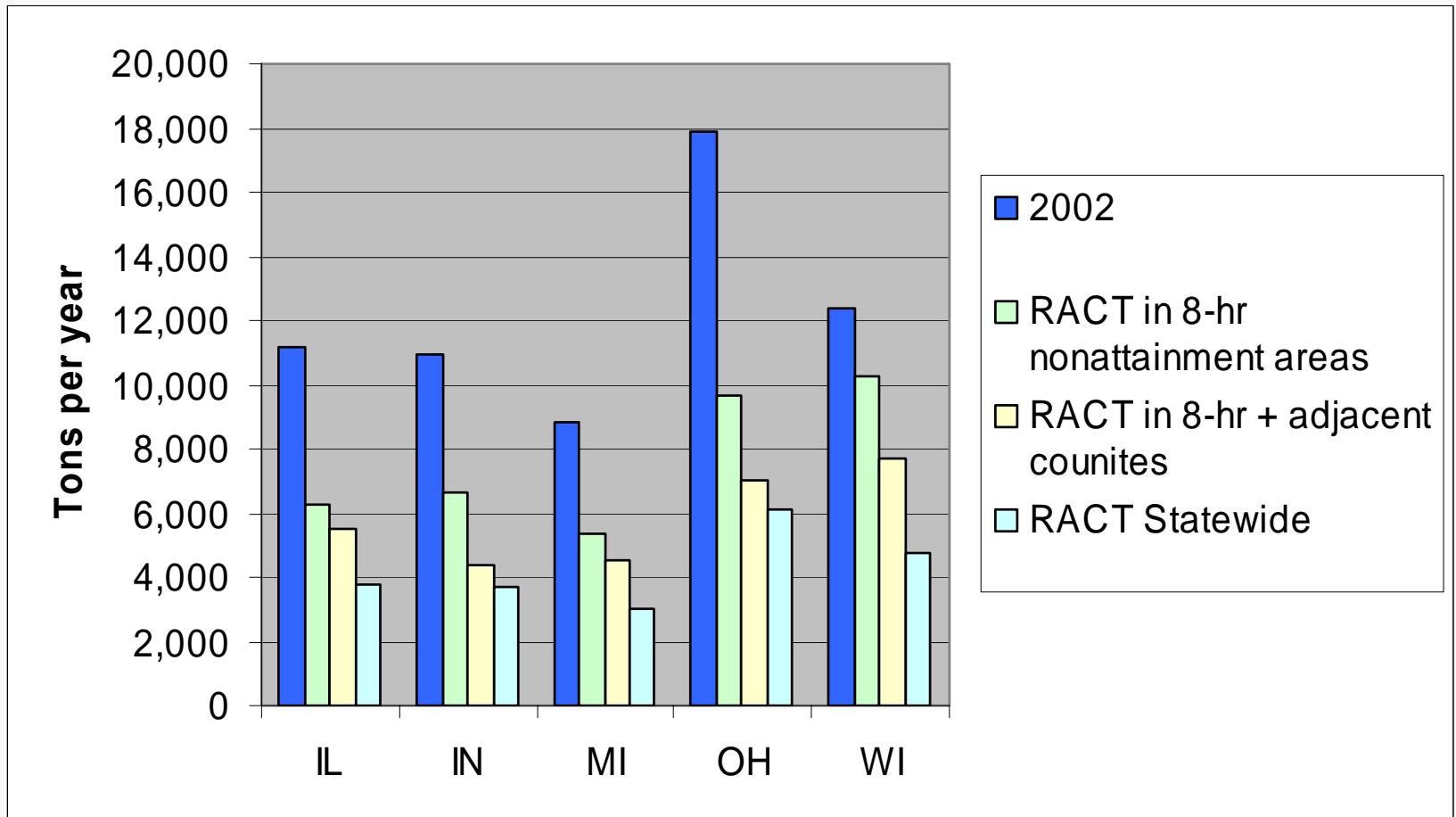
Regulatory History: AIM Coatings MRPO State Rules

- Illinois
 - Cold cleaning VOC regulation for the Chicago and Metro East areas was used as a basis for the OTC model rule
 - 66% reduction from CTG levels
- Indiana
 - equivalent regulation affecting the southern Indiana counties of Clark and Floyd
- Wisconsin
 - 30% reduction applied in the 6 county area Washington, Ozaukee, Waukesha, Milwaukee, Racine and Kenosha counties,
 - 8% reduction is applied in Kewaunee, Manitowoc, and Sheboygan counties

Candidate Control Measures: Degreasing

- *Measure SOLV6A – Adopt Chicago/Metro East Cold Cleaning RACT regulations in additional areas*
 - Prohibits the use of solvent for cold cleaning with a vapor pressure greater than 1.0 mm Hg at 68°F
 - except when used in electronics degreasing
 - 66% reduction from uncontrolled levels
 - Will primarily affect small business and solvent suppliers
 - Most cold cleaning machines provided through contract with regional and national companies - machine providers would be responsible meeting the solvent volatility limit
 - In other cases, the users and solvent providers would have to assure that the solvent meets the required limit
 - Geographic applicability
 - All 8-hr nonattainment counties
 - All counties in or adjacent to an 8-hr nonattainment area
 - All counties in the MRPO region

VOC Emissions For Degreasing Candidate Control Measure



Cost Effectiveness: Degreasing

- OTC Model Rule - \$1,400 per ton VOC
 - Based on SCAQMD Rule 1122 cost analysis

Ohio Perspective on Cold Cleaning



Proposed Ohio Regs

- Current agreement ends program in Cincinnati on December 31, 2005
- Ozone season from May 1 to Sept.30
- E-check ending means increase in VOC and NOx emissions during the season
- The 8-hour ozone anti-backsliding provision requires replacement of the VOC and NOx E-check reductions via new control strategies

Control Strategies

- VOC and NOx
- TPD reduction needed for each with loss of E-check – 5.2 TPD VOC and 4.4 TPD NOx
- NOx/VOC ratio of 2.1 : 1
- Federal criteria for emission reductions to compensate for the control measure being removed: equivalent or greater, contemporaneous, permanent, enforceable, quantifiable and surplus

VOC Control Strategies

- Final selection of controls measures and reductions:
 - Low Reid vapor pressure gasoline – 4.6 TPD VOC
 - Vapor pressure solvent limit for cold cleaners - 2.3 TPD VOC
 - Mobile equipment refinishing emission reduction via high transfer efficiency spray guns (HVLPs) – 0.40 TPD VOC

Control Strategies

- Vapor pressure solvent limit for cold cleaners
- Requires owners and operators of cold cleaners located in the specified counties to employ a solvent with a maximum vapor pressure of 1.0 mmHG after compliance date of May 1, 2006
- This control strategy has also been used in other parts of the country and more specifically in Northern Kentucky as a substitute for the vehicle emissions inspections which have also been eliminated there.
- It has been determined that this control strategy will reduce VOC emissions in the Cincinnati non-attainment area by 2.3 tons/day (TPD) during the ozone season (May-September)
- The estimated cost per ton of VOC reduced for this control measure is \$1400.

Ohio Draft Rule

- New paragraph added to OAC rule 3745-21-09, Solvent metal cleaning, for owners and operators of cold cleaners, (O)(2)(e)
- Only applies in counties of Cinci/Dayton
- Currently out for IP review
- Compliance date would be May 1, 2006
- Similar to N. Kentucky/OTC rules except no sale restriction of solvent
- Some concern that 2.3 TPD VOC reduction high

Questions? Degreasing

