Staying in Compliance & in Business with UV/EB

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- Environmental Health & Safety Committee
  - Providing information about UV/EB to federal, state and local government
  - Ensuring a place for UV/EB in legislation
  - Provide industry added tools to make a case for UV/EB
Enduser subjected to various regulations

- Federal level: Title V
- State level
- Local level: Local rules and regulations
  - Southern California typically has the most stringent emission requirements
- Volatile Organic Compounds (VOCs); Toxics,
- Greenhouse Gases; Energy Efficiency
Command and control vs. incentives

- **Command and control rules**
  - Technology forcing
  - Mandate a specified VOC limit

- **Incentives**
  - Exemptions from rules
  - Regulatory relief
UV/EB’s role

- Avoid applicability
  - Staying below thresholds through VOC reduction
- No need to install air pollution control devices
- UV/EB enables facilities to stay in compliance
- Drastic emission reductions (near zero emissions)
- No secondary adverse impacts (greenhouse gases, combustion contaminants, hazardous waste)
Federal regulations

- **Title V- Facility Permit vs. permit unit approach**
  - Applies to major sources, definition varies by region
  - Public notification

- **How can UV/EB help me comply?**
  - Avoiding applicability
    - “De minimus” facility \( \leq 19,184 \text{ gallons/year} \) of UV/EB materials with VOC content \( < 50 \text{ grams/liter} \)

- **EPA Control Techniques Guidelines for Flat Wood Paneling Coatings (2006)**
  - “This technology is gaining greater acceptance and, where applicable, achieves a near 100 percent reduction of VOC emissions”.
State regulations

- **California Air Resources Board**
  - Air Toxics Control Measure for composite wood products
    - Reduction of formaldehyde emissions from particle board, medium density fiberboard, hardwood plywood, composite veneer
    - Third-party certifier
  - ARB estimates
    - 2.5 billion square feet of composite wood products sold in CA annually
    - 400 tons of formaldehyde generated
  - ARB Suggested Control Measure for wood coatings
    - 275 grams per liter limit, mirrors SCAQMD rule
Examples of requirements

- SCAQMD Rule 1136
  - Applies to:
    - Clear & Pigmented Sealers
    - Clear & Pigmented Topcoats
    - Pigmented Primers & Undercoats
  - VOC limit is 275 grams/liter
  - Shutters (until 7/1/05)
    - Clear Topcoat ..........680 g/l
    - Pigmented topcoat......600 g/l
Do UV/EB materials comply with limits?

- Yes, typical VOC content of a UV/EB formulation is < 50 grams/liter
- Generally UV/EB materials do not contain any VOC’s
- Fluctuations in VOC content can be attributable to test methods
- Measurement of VOC content difficult with low VOC materials
SCAQMD Technical Assessment

- SCAQMD findings:
  - UV /EB wood coatings have been around for over 40 years
  - Water & acetone formulations can achieve thinner film depositions
  - All application types are available (flow, roller, sprayable)
  - Various glosses available
  - Stains, other semitransparent materials, pigmented coatings available
  - “UV coating on wood substrate is a viable option to regulatory compliance and coating performance for a wide variety of products.”
Pollution prevention in lieu of add-on-controls

- Lowest Achievable Emission Rate/Best Available Control Technology (Major Sources)
  - UV/EB defined as “Superclean” (< 5% by wt. VOC)
  - BACT/LAER for:
    - Wood & plastic coatings
    - Printing
Less regulatory hassles with UV/EB

- Reduced SCAQMD recordkeeping for UV/EB
  - Monthly recordkeeping: Materials < 50 grams/liter at all facilities
  - Total exemption from recordkeeping: Materials < 50 grams/liter at facilities < 4 TPY

- Added flexibility with emission averaging option
  Rule 1136 (c)(1)(D)(i)

- Permit exemption - Rule 219
SCAQMD plan

- UV/EB identified as an “advanced technology” to help SCAQMD achieve its clean air goals (Chapter 4, page 68)

- “UV and EB curing products can be used on virtually all substrates, from metal and wood to glass and plastic.”

- “Other advantages include the attainment of very high gloss levels, reduction of VOC emissions and solvent odors, and reduced energy consumption.”
SCAQMD and EPA policy

- Superclean materials equivalent to add-on-controls
- Superclean materials comply with source specific rules and BACT/LAER

- San Joaquin District concludes that UV technology is more cost effective than add-on controls
Impact of Regs. on Enduser

- Rulemakings and regs can shape business decisions.
- Spark enduser interest in UV/EB
- Provide the perspective of an “impartial” third party rather than that of a “vendor”
- Real life Anecdotes:
  - Wood Coater in Desert Hot Springs, CA
  - Printer in Chino, CA
Cost savings

- Less permit costs
  - Permit processing fee for coating/drying
    - $3,359
  - Annual Operating Fee
    - $1,087
Cost savings

Example: Facility using 20 gallons/day @ 275 g/l

20 gal/day x 2.3 lb/gal = 46 lb/day

46 lb/day x 5 day/week x 52 weeks/year = 11,960 lb/yr

11,960 lb/yr x 1 ton/2,000 lb = 2.99 tpy

Annual emission fees =\(5.98 \text{ tpy} \times 535.33/\text{ton}\)

= $3,201.27/year

- Emission Reduction Credits $5,000/Pound VOC

\[46 \text{ lb/day} - 22 \text{ lbs/day} \times 1.2(\text{offset factor}) \times 5,000/\text{lb}\]

= $144,000

*Free offsets of 22 lbs/day
Conversion to UV/EB

- Facility using 20 gallons/day @ 50 g/l

  20 gal/day x .42 lb/gal = 8.4 lb/day

  8.4 lb/day x 5 day/week x 52 weeks/year = 2,184 lb/yr

  2,184 lb/yr x 1 ton/2,000 lb = 1.09 tpy

  = $ 0 /year (facilities under 4 TPY do not pay emission fees)

- Emission Reduction Credits (free offsets for processes under 4 TPY)

  = $ 0
Savings from conversion selected air quality fees only

- Savings in permitting fees = $3,359
- Savings in operating fees (annual) = $1,087
- Savings in emission fees (annual) = $3,201
- Savings in ERCs (one time fee) = $144,000
- Savings = $151,647

Does not include additional fees (Title V; public notice and other)
Policy change = savings

- Example: Emission factor for UV/EB materials reduced from 5% VOC to 2% VOC

- For 20 gallon/day facility

- 20 gallon/day x .25 lb/gallon x $5,000/lb
  
  = $ 25,000

- Example: GCMS testing v. ASTM testing

  - GCMS = $1,500 PER sample
Future Trends

- Lower VOC limits
- Regulators will need new test methods to measure very low VOC levels
  - SCAQMD architectural coatings rule R1113, limits of 50 grams/liter
  - Supercompliant definition in R1113 is 10 grams/liter

- Energy Efficiency
- Greenhouse gases
- Toxic Air Contaminants
- VOC reactivity ??
Conclusion

- UV/EB can ease regulatory burdens and help industry stay in compliance and in business.
- Increased production and VOC reduction can go hand in hand.
- UV/EB can offer process advantages, controls simply destroy VOC’s.
- There are no secondary pollutants (NOx, SOx, CO, greenhouse gases) generated with UV/EB.
- Conversion may equal $$$$ SAVINGS.
THANK YOU

Contact information

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Regulatory resources

www.aqmd.gov

www.arb.ca.gov

www.epa.gov