Technical Solutions: Safer Feasible Alternatives
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IRTA Approach to Finding Alternatives

- Investigate and work with selected industry, determine use characteristics and figure out what alternatives might work
- Variety of options
  - Eliminate need for operation
  - Substitute process alternative
  - Substitute chemical alternative
- Test alternatives
- Evaluate performance and cost
- Examine health and environmental effects
- Worker toxicity is most serious issue
Exempt chemicals can be used as chemical alternatives

EPA exempts chemicals based only on reactivity whereas California considers other factors

When SCAQMD exempts a chemical, formulators and users use it extensively
  - VOC limits are low
  - Drop-in substitution is easiest way to comply
  - Believe exemption is stamp of approval to use

District needs policy for exempt chemicals that takes into account increased worker exposure
Examples of Eliminating Need for Operation

- Company making silicone implantable medical devices
  - Converted to high density polyethylene pots and eliminated need for cleaning
- Schools and public buildings using floor wax strippers to remove wax from VCT floors
  - Use alternative flooring or coatings that don’t require waxing or stripping
- Company making boat hulls using molding process
  - Convert from wax based release agent to water-based liquid release agent and eliminate need for cleaning molds with styrene
Examples of Process Alternatives

- Companies using methylene chloride paint strippers or agencies using graffiti removers
  - Convert to abrasive blasting operations
- Companies using solvents for vapor degreasing and cold cleaning operations
  - Convert to water-based cleaning systems
- Companies using methylene chloride or n-propyl bromide adhesives for foam fabrication, mattress manufacturing, or upholstered furniture manufacturing
  - Convert to water-based or hot melt adhesive
Examples of Chemical Alternatives

- **Companies using VOC lubricants**
  - Convert to water-based or vegetable based lubricants
- **Companies making asphalt, contractors applying asphalt using diesel release agents**
  - Convert to recycled vegetable oil
- **Contractors using VOC release agents for concrete stamping**
  - Convert to petroleum based lubricant
- **Furniture strippers using methylene chloride based stripping formulations**
  - Convert to benzyl alcohol formulations
- **Consumers, shops using VOC, toxic auto aerosol cleaners**
  - Convert to acetone formulations with carbon dioxide propellant
Challenges in Choosing Chemical Alternatives

- Best option is to select very low VOC content options like vegetable based material
  - Likely to be low in toxicity

- Another option is to exempt chemicals and select them as alternatives
  - Some chemicals have toxic endpoint
    - Don’t exempt them (TBAC, DMC)
  - Some chemicals have very little toxicity information
    - Precautionary principle indicates they shouldn’t be deemed exempt (PCBTF)
  - Some chemicals are low in toxicity
    - They can be exempted (acetone)
Exempting a chemical from VOC regulations gives it preference and indicates District thinks it should be used in place of other options.

Deciding not to exempt a chemical is not the same as banning it or restricting it.

- Suppliers can still formulate with it and users can use it.
- It is just counted as a VOC.
Results and Conclusions

- IRTA focuses on finding cost effective alternatives that perform well for range of different solvent applications
  - Options include eliminating the need for the operation altogether and using process alternatives
  - If chemical alternative is needed, rely on very low VOC content materials and exempt chemicals with known, low toxicity
- Chemicals with toxic endpoints and chemicals with unknown toxicity do not need to be used and they should not be exempted
  - Safer alternatives can be found without giving them preference
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