Integrating P2 into the Permitting and Enforcement Processes

Woodfinishing Industry

Woodfinishing processes involve great amounts of air-borne and solvent pollution, and lend themselves well to many P2 opportunities such as:

- Adhesives application alternatives and material substitution
- Alternative coatings and application methods
- Solvent alternatives and improved management practices
- Wood waste reuse

Adhesives Alternatives: Hot melt, heat seal, aqueous-based, and PVA adhesives are considered alternatives to solvent-based adhesives. A large manufacturer of all types of office furniture switched to a two-component, aqueous-based, formaldehyde-free contact adhesive and realized an 88% reduction in VOC emissions and a 33% reduction in adhesive use. Utility savings were estimated at $16,000 per year because they no longer needed to use a drying oven to dry the glue. Equipment cost can be $3,000 for corrosion-resistant HVLP application guns and more if the delivery is hard piped to the point of use.

> **Permitting:** Alternative glues can be used in air permitting to limit VOC and HAP emissions; hard piping the glue delivery can save on material use and cleaning solvent use, further reducing emissions.
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> **SEP:** Alternative glues can be used in settlements for air and hazardous waste, as it will reduce emissions and hazardous waste since wash up is with water.

Coating Alternatives: Wood coatings are usually very high in VOC and HAP content. Some alternative coating considerations are low VOC and HAP formulations, water-borne coatings, hybrid systems, and UV-cured coatings. A switch to water-based coatings may only involve switching to corrosion-resistant spray guns and ovens to speed drying time. Stainless steel spray guns cost approximately $1,200 each, and drying ovens can be quite expensive depending on size. UV-cured coating systems require a significant capital expenditure, typically on the order of $200,000 to $250,000 for a completely automated flatline system that applies and cures two finish coats.

One company switched to water-born coatings and reduced its hazardous waste by 10,000 pounds/year, VOC emissions by 54 tons/year, and coatings use by almost 20,000 gallons/year. The company eliminated the need for an air permit and became a conditionally exempt small quantity generator of hazardous waste.

> **Permitting:** Alternative coating or low VOC and HAP coatings can be integrated into the air permit as a method of limiting emissions, or to eliminate the need for a permit as well as reduce reporting requirements in the air and RCRA media divisions

SEP: Investment in alternative coatings always requires equipment changes, training, and in many instances in R & D to determine acceptability or specific coating chemistry development. Conversion to UV coating is a very costly endeavor for companies but can result in near elimination of VOC and HAP as well as hazardous waste.

Application Methods: Transfer efficiency, or how much coating actually gets on the part is dependent upon the type of equipment used and the operator's skill and technical knowledge of that system. Transfer efficiency (TE) can be increased by changing to spray guns with higher TE, by operator training, and by changing to a completely different coating method, such as roll or dip coating-each of which has 100% TE. Coating recapture, closed loop, and dedicated delivery systems can also be used to reduce coating use and losses.

One company invested in a reclamation system for sealer overspray. The system is designed to catch most of the overspray before it falls into the wash water tank. After about five gallons of overspray is collected, the overspray is removed and solvent and catalyst is added to the material to obtain the desired coating properties. It is then added back to the spray system to be reused. The system cost about $2500 per installed booth. Savings included $23,000 annually from reduced material usage. Waste sludge was reduced from 50 to 25 gallons per day, saving the company $30,000.

A cost/benefit for a Kansas company investing in a three component mix system for its topcoat applications indicated a savings of $47,000 per year. The equipment cost is approximately $15,000; equipment payback is about four months and hazardous waste generation could be decreased by 1500 gallons annually.

Permitting: Use of higher TE systems can be used to reduce material purchases and limit VOC emissions; in some cases this change of application method may eliminate the need for a permit.

SEP: Capitol costs of new equipment may be used to offset penalties in air and hazardous waste. Violators could also support operator efficiency training or workshops on hazardous waste and air emissions calculations and P2.

Wood Waste: Wood waste represents a very large volume waste stream for wood product manufacturers. Although there are many P2 options for wood waste, cost effectiveness is very dependent on location and proximity to reuse facilities. On-site reuse is usually more economical but may involve large capital expenditures. A cost-benefit analysis for one Kansas company to recycle its wood waste to mulch indicated an income potential of $136,040 per year with an equipment payback period of four months. This P2 option would divert over 7000 tons of wood waste from the local landfill annually. Although wood waste is not associated with permitting-the benefits of wood waste reuse are considerable and could be used as a SEP for multimedia benefits.