Pollution Prevention Steps for Plastic Coaters-ASimplified Approach, Part I

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This article features pollution prevention practices and facility planning successfully undertaken by Lacks Enterprises, Inc., an automotive supplier in Grand Rapids, MI. Primary emphasis is placed on the painting of plastic exterior trim components. Source reduction process changes, including methods to reduce paint and solvent usage and wastes, are highlighted.

Lacks Enterprises supplies painted plastic exterior trim components to the automotive industry. The company's pollution prevention plan underscores efficiency, good house-keeping practices, closely monitored emissions, and energy conservation.

Pollution prevention is the use of materials, processes or practices that reduce or eliminate the creation of pollutants or wastes at the source. It includes reducing the use of hazardous materials, energy, water or other resources, and the protection of natural resources through conservation or more efficient use.

The key phrase here is "at the source" (source reduction), which excludes offsite recycling, treatment and disposal, but includes "in-process recycling." Waste reduction, on the other hand, is thought by some to be the same as waste minimization, but according to the U.S. Environmental Protection Agency, it's the same as "source reduction." Waste minimization also includes on-site and off-site recycling activities, providing the activities involve beneficial *use* or reuse, or reclamation.

There is nothing that says you can't write a pollution prevention plan to include off-site recycling. There are no pollution prevention credits for these activities, but you will at least have a plan encompassing everything you're doing to minimize waste,

Waste Minimization Priorities

Certainly, a company's priorities should be on source reduction and in-process recycling and away from treatment and disposal, but it would be foolish to ignore off-site reclamation if it's a viable and economical solution. This point is very relevant to plastic coaters who are trying to manage paint waste solids. Recycling all this material on-site for reuse into the process is virtually impossible. On the other hand, there are opportunities to ship this material to off-site recyclers who can process this material into a marketable product.

Pollution Prevention Incentives

The reasons for establishing pollution prevention are many: The environmental liabilities are loweer; the public's perception of our industry is enhanced when we're recognized for pollution prevention efforts; and there are numerous other incentives.

Lower Costs

Generally, pollution prevention practices are less costly than treatment and disposal, and in some cases may be less costly than treatment and off-site reclamation. As state, local and national environmental policies continue to force costs for treatment, disposal and off-site reclamation to escalate, source reduction will become even more attractive. Through source reduction, savings in material and manufacturing costs should be realized and utility costs should decrease for water, sewer, and electricity.

Decrease/Eliminate Regulated Actvities

Without a doubt, plastic coaters belong to one of the most heavily regulated segments of the finishing industry. The many environmental regulations we face provide us with a very big incentive to practice source reduction. Some of these regulations—"technology forcing" -really don't give us much choice in the matter. The federal Clean Air Act, New Source Performance Standards (NSPS), for example, in effect for the coating of plastic business machines, are so low that the only way to comply is by using waterborne coatings or otherwise installing add-on control equipment. Fortunately, waterbased paints exist today for the coating of plastic computer parts.

The Resource Conservation and Recovery Act (RCRA) land disposal restrictions and bans certainly have narrowed our options. As a result of the new RCRA Boiler and Industrial Furnace (BIF) regulations, which recently went into effect, some fuel blending operations that previously utilized hazardous solvent/paint wastes as a supplemental fuel source for cement kilns may have ceased operations or otherwise increased their rates because of added regulatory compliance costs.

Plastic coaters must also contend with the SARA (Superfund Re-authorization Act) Title III requirements, including the Form R, which was modified in 1991 to more or less serve as a facility's report card on pollution prevention activities.

The DOT rules that apply to the shipment of hazardous wastes are changing almost continuously, imposing new requirements for generators for packaging, labelling and manifesting of hazardous waste.

Clean Air Act

The 1990 Clean Air Act Amendment is considered the most comprehensive environmental law ever passed in the U.S. Congress to date. It will require facilities during the next couple of years to apply for and obtain renewable operating permits for air emissions. These amendments also require EPA to promulgate strict air toxic regulations imposing Maximum Achievable Control Technology (MACT) Standards during the next few years for various source categories that use chemicals defined as air toxics. The federal fist of 189 chemicals includes several common solvents used in the plastic coating industry.

Clean Water Act

The National Pollutant Discharge Elimination System (NPDES) stormwater permits as mandated by the Clean Water Act present yet another new regulatory requirement for industry. The deadline for submitting NPDES stormwater permit applications for "individual permits" was October 1, 1992. It's anybody's guess as to if and when permits will be issued, or what kind of permit conditions will be specified for record-keeping and monitoring when they are.

Some new federal legislation was introduced in the U.S. Senate in 1992 (S 1081), calling for extensive amendments to the Clean Water Act. Some key elements of this proposed legislation are changes in water quality standards, inclusion of indirect dischargers into the NPDES System, and a repeal of the RCRA exclusion that exists for dischargers to POTW systems (Publicly Owned Treatment Works).

Reducing Environmental Liabilities

Another driving force behind pollution prevention activities is the desire we all have to lower our environmental liabilities, both short- and long-term. Through the last 10 years or so, industry has become all-too-familiar with what the dreaded acronym "PRP" (Potentially Responsible Party) means.

If a generator can reduce the volume and frequency of hazardous waste shipments made to off-site treatment, disposal and recycling facilities through better source reduction, the chances of being named as a PRP for a Superfund site will be less. Even if a generator picks the best transporters and the most environmentally sound TSDR (treatment, storage, disposal & recycling) facilities, Murphy's Law may still claim you. Using fewer and a lesser quantity of hazardous



When preparing a pollution prevention plan, simplify a schematic of operations to show only the essentials of the process. This is a schematic of the Lacks Enterprises 52nd Street painting facility.

chemicals not only helps to lower your environmental liabilities, it also reduces your liability for worker safety.

Expect That Change Will Be Required

To really make any headway at pollution prevention, expect that changes will be required. This includes changes in the products manufactured, as well as in the processes used to make these products. Process changes may include modifications or substitutions to the materials we input to the process; it may include technology changes, such as equipment modifications; or it may include improvements in operating practices.

Product Changes

Product changes aren't so easy to accomplish if your company is a supplier to the OEMs (original equipment manufacturers). Designing products to increase product life and to minimize environmental impact is predominantly the OEMs responsibility. Because the OEMs are responsible for the original product design, the evaluation of product changes to increase product life, or life cycle analysis, is usually performed by them. With very few exceptions, this also applies to changes in the product to minimize environmental impact.

Suppliers may suggest alternate plastic resins to the OEMs during quoting, but this usually entails an extensive approval process that suppliers must go through to demonstrate that the alternate materials meet or exceed the product specifications. If the tooling hasn't been built yet, suppliers sometimes have the opportunity during quoting to request minor changes in the part design, such as the addition of drain holes or drain slots. Adding a few drain holes to a part at strategic locations doesn't do much to increase source reduction in the coating process, but it does help to improve part drainage in part washing operations.

Other beneficial changes that may be possible during product design include designing in tabs or other minor features on the part to facilitate the most efficient racking arrangement so coating transfer efficiency is maximized. A minor change in the design could significantly reduce coating usage, especially if it's a high volume job.

Process Changes

Unlike product changes, suppliers have considerably more control over process changes. Consequently, this is where plastic coaters will find the greatest number of opportunities to implement source reduction activities. Not to say that OEMs don't demand certain processes, but even within these constraints, suppliers still have a reasonable amount of flexibility in finishing processes. For automotive work, plastic coaters are restricted to coatings that have been approved by the OEMs, and this approval process may take several months to a couple years. There are currently very few waterborne coatings approved by the OEMs, for example, for the coating of exterior automotive plastic trim components. This is expected to change in the near future, though, as stricter coating standards go into effect.

Preparing the Plan For Pollution Prevention

The Schematic

Before discussing methods to reduce these wastes right at the source, a schematic of the process should be developed. To avoid getting bogged down during this step, simplify the schematic so it shows just the essentials of the process and try to exclude unneeded details. (Please refer to the Lacks Enterprises 52nd Street painting facility schematic.)

Generic List-

Source Reduction Activities

Before going over some of the specific process changes that are possible, take a few moments and review the general list of activities given in EPA's *Facility Pollution Prevention Guide.*

Multi-Environmental Media Waste Inventory

Once the general source reduction activities are known, the next step is to translate these general activities into specific activities at your facility. Before doing that, though, it makes sense to first prepare a multi-environmental media list of all the wastes generated at your facility. This fist should include all waste byproducts, including those emitted from the process either as an air contaminant, a water pollutant or as a solid residue. This evaluation should actually be done for each hazardous and extremely hazardous chemical used in your plant. To keep from getting too muddled with details, this list should be somewhat generic at first.

Multi-Media

Pollution Prevention Practices

When the multi-media waste inventory is complete, begin preparing a source- specific pollution prevention plan. This plan should include quantitative and qualitative descriptions of all current source reduction practices, and the identification and evaluation of future source reduction measures that may be feasible for your operation.

Next, select one of the three environmental media and begin evaluating each individual waste. The medium analyzed first is up to you. (The sequence chosen for the Lacks Enterprises facilities was solids first, followed by liquids and air contaminants.)

Reducing Solid Wastes

With the cost of paint being so high, it is every coater's goat to minimize paint

scrap. Regardless of how well one does on source reduction, however, there will inevitably still be some scrap paint generated. If your operation uses solvent-based coatings, the scrap paint you generate not only hunts your bottom line because of material costs, it also creates hazardous wastes, which result in very costly disposal fees.

Reclamation/Disposal of Paint Wastes; On-site Reclamation

Because scrap paints are typically high in solids, the solvents contained in them are generally not reclaimed. Even if if would be feasible to reclaim them, the hodgepodge of solvents recovered may not be of any use. On the other hand, if the scrap paint is low in solids and you are able to blend them with a larger quantity of other solvent-type wastes— perhaps cleaning solvents-then the paint solvents could perhaps be reclaimed and still be of some use.

The idea here is to dilute a small amount of paint solvents with a larger quantity of a one-component or two-component cleaning solvents. The net result is that the solvent mixture reclaimed is still active enough to be used as a cleaning solvent. The use of this "dilution" technique, which is i I legal when applied to treatment and disposal of hazardous wastes, is acceptable here because it involves a beneficial reclamation process.

Off-site Fuel Blending & Reclamation

A common disposal method for scrap paint is off-site fuel blending. Although EPA may not look at it the same way generators do, it would be fair to say that fuel blenders are involved in energy or resource recovery because the material they accept is typically used as a supplemental fuel source for operating cement kilns. In this disposal method, the waste solvents are thermally oxidized to a very high degree, generating a small amount of solids that are usually considered inert and nonhazardous. The material is incinerated at such a high temperature (1800+ °F) that all the material is essentially destroyed. This is somewhat comforting to hazardous waste generators, but it still doesn't preclude environmental degradation from occurring when this material is handled both on-site, off-site and in between. That is why EPA is being so restrictive in its definition of pollution prevention. It wants these materials to be reduced at the source, to lessen the chances of creating new Superfund sites. In a broader sense, one could call it risk management.

Besides deep well injection, there are really only two disposal options available for waste solvents: Fuel blending or solvent reclamation. As a result of the primarily negative "out of sight, out of mind" label associated with deep well injection, it's doubtful that many generators will choose this method of disposal. Although the financial and material conservation benefits of off-site reclamation can't be denied, it has risks equal or greater than fuel blending. The more the material is handled or transferred, the greater are the risks that something may go wrong.

Which of the two methods involves more handling or transferring will be different for each situation. That is, when waste solvents are shipped to off-site reclaimers, the material may travel from your facility to the reclaimer, and directly back to you, or it could come back to you indirectly through a distributor.

Similar transfers are involved in fuel blending. The material may go from your place directly to the cement kiln, or, as is more common, it may first go to the blender, where it is mixed with other generators' waste prior to being shipped to the cement kiln. In each case, the environmental risks are there, and the generator needs to decide which option has the lowest environmental risks.



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February Issue, Part II

Following this month's presentation concerning regulations, background information, and how to prepare a pollution prevention plan for painting on plastic operations, Lamancusa will focus on transfer efficiency (T. E.) and selection of application equipment to increase T. E., alternate coating technologies, solventand water-based coatings, and much more. His detailed overview will provide a variety of successfully used, hands-on techniques for improving the practice of pollution prevention in a painting on plastics shop.