



**Final Report**



**Summary Report: Auto Body  
Safer Alternatives  
Feasibility Study**



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This report was prepared by the Local Hazardous Waste Management Program in King County, Washington, a coalition of local governments. Our customers are residents, businesses and institutions with small quantities of hazardous wastes. The Program's mission is: to protect and enhance public health and environmental quality in King County by reducing the threat posed by the **production, use, storage and disposal** of hazardous materials.

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## Acronyms and Abbreviations

°C	Degrees Centigrade
CAS	Chemical Abstract Service
DfE	Design for Environment-U.S. EPA
DW	Dangerous Waste
EPA	United States Environmental Protection Agency
Ecology	Washington State Department of Ecology
°F	Degrees Fahrenheit
HOC	Halogenated Organic Compound
LHWMP	Local Hazardous Waste Management Program in King County
MSDS	Material Safety Data Sheet
OSHA	United States Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PPRC	Pacific Northwest Pollution Prevention Resource Center
PPS	Paint Preparation System
SQG	Small Quantity Generator
STAR	Spray Technique Analysis and Research
VOC	Volatile Organic Compound



**Report authors at auto body paint facility**

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## Executive Summary

In 2013, the Local Hazardous Waste Management Program in King County (LHWMP) investigated the feasibility of transitioning the auto body industry in King County to safer alternative products to reduce health and environmental risk. The purpose of this report is to summarize LHWMP's 2013 feasibility study, which aimed to determine whether waterborne paint systems and alternative gun cleaners are viable safer alternatives to traditional solvent-based products. The report presents the study findings and is intended to inform LHWMP staff so that decisions can be made regarding whether to promote safer alternatives to this industry.

The aim of the study was to address three topic areas regarding waterborne paint systems and safer alternative gun cleaners: (1) the current state of technology, (2) the attitudes and barriers of manufacturers, distributors and auto body shops to using waterborne paint systems, and (3) the feasibility of LHWMP promoting waterborne paint systems and alternative spray gun cleaners.

Study methods included Web literature research; participating in a training at an auto body paint facility; sampling and characterizing waterborne paint system waste and products; and key informant interviews of EnviroStar shops, paint manufacturers, distributors, wholesalers, hazardous waste haulers, refinish paint trainers, nonprofits, and trade associations.

Study findings revealed that no independent studies have been conducted that critically review the risks associated with applying waterborne coatings and using alternative gun cleaners. In addition, no studies were found that characterize the waste. The literature did reveal that both solvent-based and waterborne coating systems may contain heavy metals, halogenated organic compounds (HOCs), and isocyanates (a highly reactive respiratory irritant). A difference between the two systems is the solvents they contain.

Our limited waterborne paint waste sampling found that some waste may designate for persistence due to HOCs. Fish bioassay results on the same waste sample indicated it did not designate as a dangerous waste due to toxicity.

Study estimates are that about 10% of the auto body shops in King County currently use waterborne products (out of 328 total shops). Worker and environmental safety, lower levels of volatile organic compounds, cost effectiveness, higher quality products, and the desire to demonstrate progressive business practices are reasons shops switch to waterborne products. Cost (\$2,000 - \$25,000), the need to retrain staff, misconceptions, and reluctance to change are barriers to switching.

The study concluded that waterborne paint products may contain hazardous ingredients. It also concluded, that additional study is needed to determine if these products should be promoted by LHWMP to the auto body industry.

We recommend the following activities for LHWMP and/or our program partners:

- Shops that convert to waterborne paint systems should test their waste stream(s) to determine whether the waste(s) designate according to federal and Washington state regulatory requirements.
- Waste streams from waterborne paint systems may designate as dangerous waste. LHWMP should take an active role in making sure these waste streams are properly managed or are not generated in the first place by encouraging manufacturers to manufacture and businesses to choose products that generate less hazardous waste (e.g., paints without heavy metal and HOC containing pigments).
- Waterborne paint systems appear to be comparable to solvent-based systems regarding cost, availability, and performance. LHWMP should participate in completing hazard and exposure assessments to facilitate decisions regarding the promotion of waterborne auto body paint technology (additional LHWMP sampling and an exposure assessment study is currently being conducted).
- LHWMP should consider promoting waste reduction systems and equipment, such as the Spray Technique Analysis and Research (STAR) system (in collaboration with PPRC), the 3M Paint Preparation System (PPS), and enclosed automatic spray gun washers.
- LHWMP should continue evaluating safer alternative spray gun cleaners and make a decision regarding promotion as an alternative to lacquer thinner (for shops that use solvent-based paint systems and products). LHWMP should consider revising EnviroStar guidelines to prohibit the use of lacquer thinner in (at least) 5-star shops. Explain to shops that “recycled” lacquer thinner is still hazardous.
- If a decision is made for LHWMP to promote waterborne paint systems, promotion should be in collaboration with a non-governmental organization and should include educational efforts to address misconceptions. LHWMP should continue supporting local shops that use a waterborne system to host demonstration sessions directed toward shop owners and painters.
- LHWMP should encourage the use of appropriate personal protective equipment (PPE) at shops using waterborne paint systems.
- LHWMP’s field teams should track business process data (e.g., which auto body shops are using waterborne coatings and which paint system is being used). The lack of data fields and systems to record business processes is a missed opportunity to capture data from LHWMP’s Business Field Team and others that would be useful to LHWMP as a whole.
- LHWMP should work with EPA’s Design for Environment program (DfE) and explore creating a DfE label for auto body paint system products.

# Introduction

In the summer and fall of 2013, LHWMP conducted the Auto Body Safer Alternatives Feasibility Study. This report summarizes the findings from that study. This section introduces the rationale for the study and how the term “safer alternatives” was defined in this context. In addition, there is an overview of what is included in the rest of the report.

Transitioning businesses to safer alternatives is one approach the Local Hazardous Waste Management Program in King County (LHWMP) and businesses can use to reduce the risk from hazardous materials. Safer alternatives are chemical and non-chemical alternatives that replace hazardous chemicals or technologies because they have less potential for human health and environmental impacts.

King County auto body shops use hazardous materials for which the literature has suggested the availability of potential safer alternatives. The purpose of the Auto Body Safer Alternatives Feasibility Study was to conduct a study to determine if two safer alternative candidates, waterborne paint systems and alternative gun cleaners, are viable safer alternatives for LHWMP to promote to the auto body industry in King County.

This report emphasizes and summarizes the results to key questions outlined in the project proposal. More detailed internal reports are available on the LHWMP Extranet.<sup>1</sup> The purpose of this report is to present the project findings and inform LHWMP staff so that decisions can be made regarding whether to promote safer alternatives to this industry.

The primary report sections include:

- Background and Methods section, which explains LHWMP’s history with the auto body industry in King County, the background for the 2013 study and the general methods used to conduct the study.
- Findings section, which provides results to the key project topic areas investigated.
- Conclusion and Recommendations section, which offers conclusions and suggestions about future work with this industry.

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<sup>1</sup> Blank, K. (2014). Characterizing the Products and Wastes Associated with Waterborne Coating Used in Auto Body Collision Repair. LHWMP Extranet, Doc# 1904.

Blank, K. (2014). Waterborne Coatings and Safer Alternatives in the Auto Body Repair Industry: Literature Search and Key Informant Interviews. LHWMP Extranet, Doc# 1903.

Blank, K., (2014). Auto Body Refinishing Industry and the Local Hazardous Waste Management Program: Perspectives on Collaboration Opportunities and Techniques. LHWMP Extranet, Doc# 1906.

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# Background and Methods

## Background

LHWMP has provided hazardous waste management technical assistance to King County auto body shops since the early 1990s. More recently, in conjunction with LHWMP's increasing interest in transitioning businesses to safer alternatives, this industry was selected for study regarding its potential for using safer alternatives.

In 2011, LHWMP intern Brad Cleveland conducted a needs assessment of auto body shops to discover their attitudes about safer alternatives (Cleveland, 2011). This needs assessment found that automotive refinishing manufacturers are viewed by auto body shop staff as the most credible source of industry-specific information and that waterborne paint systems, which are generally considered safer alternatives by the industry, have not been widely adopted within the industry. Cleveland (2011) recommended that LHWMP should work with auto body refinishing manufacturers and distributors to determine their motivations and limitations to developing and producing safer alternatives.

The 2013 Auto Body Safer Alternatives Feasibility Study builds on the work from 2011. The 2013 project was designed to answer the following three key questions about waterborne paint systems and safer alternative gun cleaners:

- What is the current state of technology?
- What are the attitudes and barriers of manufacturers, distributors and auto body shops to using waterborne paint systems?
- What do the findings indicate regarding the feasibility of LHWMP promoting waterborne paint systems and alternative spray gun cleaners?

## Methods

- Web literature research using PubMed and Google Scholar databases and several search term queries.
- Key informant interviews:
  - EnviroStar shops (Envirostars is a LHWMP/regional certification program)
  - Paint manufacturers
  - King County distributors and jobbers (i.e., wholesalers)
  - Hazardous waste haulers
  - Refinish paint trainers
  - Nonprofits
  - Trade associations
- Training at an auto body paint facility.
- Sampling/characterization of waterborne paint system waste and products.

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# Findings

This section summarizes the findings from the study and is divided into four topic areas: current state of technology, data gaps, attitudes and barriers, and promotion. The emphasis is waterborne paint systems, but the section also includes findings for safer alternative gun cleaners. This section reviews the potential hazards of waterborne paint systems and how they differ from solvent-based systems, the usage of waterborne paint systems within King County, and addresses factors to consider about promoting the waterborne technology.

## Current State of Technology

**Solvent and waterborne basecoats are different.** Table 1 shows a comparison of solvent and waterborne auto body basecoat constituents. This feasibility study attempted to find out the significance of these differences in terms of impact to human health and the environment.

Table 1. Comparison of solvent and waterborne basecoats		
Constituent	Solvent	Waterborne
Binders/Resins	Lacquer, enamel, or urethane	Latex particles
Pigments	Heavy metals, halogenated organic compounds (~15%)	Heavy metals, halogenated organic compounds (~20%)
Carriers	Solvents (xylene, toluene, methyl ethyl ketone, methyl isobutyl ketone, ethylbenzene, etc.) 70-85%	Water (70%) + Solvent [2-butoxyethanol, etc.] (10%)

**Waterborne paint systems available in King County.** Table 2 shows the manufacturers and waterborne paint systems product lines available in King County. Each of these manufacturers produces waterborne basecoats and (typically) several other components of the refinish paint process that are compatible with their waterborne basecoat. Some of these components may also be waterborne (e.g., primers and cleaners); other components may not yet be manufactured as waterborne products for distribution in the United States (e.g., clearcoats), but are nonetheless compatible.

Table 2. Major auto body paint manufacturer waterborne product lines available in King County	
Manufacturer	Product Line
AkzoNobel	Wanda Waterbase System
AkzoNobel	Lesonal Basecoat WB
AkzoNobel	Sikkens Autowave MM
Axalta Coating Systems (formerly DuPont Refinish)	Cromax Pro
Axalta Coating Systems (formerly Standox)	Standoblue
Axalta Coating Systems (formerly Spies Hecker)	Permahyd Hi-TEC
BASF	Glasurit 90 Line
BASF	R-M Onyx HD Waterborne
PPG	Enviroase HP
PPG	Aquabase Plus
Sherwin Williams	AXW Performance Plus Waterborne

**Waterborne paint systems may contain hazardous chemicals.** Waterborne basecoats contain 70% water, 10% organic solvents, and 20% pigment, metallic and pearlescent particles (Hults, 2009). The organic solvents found in waterborne paints are typically low molecular weight polar ketones, alcohols, and esters (Sabreen, 2012). 2-Butoxyethanol appears to be a common solvent in waterborne basecoats. These solvents are potentially hazardous. No occupational exposure assessments investigating waterborne paints have yet been conducted, although researchers from the University of Washington in collaboration with LHWMP are currently evaluating inhalation exposure experience by painters.

The pigments used in waterborne basecoats are the same as those used in solvent-based paints, and may contain halogenated organic compounds (HOCs) and heavy metals (e.g., lead, hexavalent chromium, etc.).

Waterborne paint systems also use isocyanates, a hardening product traditionally used in refinish paints and a leading cause of occupational asthma<sup>2</sup>.

Twelve products and one waste stream were analyzed as part of the feasibility study. All the products were from the same manufacturer's waterborne paint system. Table 3 is a summary of result highlights.

<sup>2</sup> In 2013, the United States Occupational Safety and Health Administration started a national emphasis program for occupational exposure to isocyanates (OSHA, 2013).

Table 3. Auto body waterborne product and waste analysis results highlights <sup>3</sup>	
Twelve products	Unsprayed paint waste
Chromium (found in 42% of samples)  m,p-Xylene; o-xylene; and ethane, 1-chloro-1, 1-difluoro (found in 58% of samples)  Flocculant : barium, acetone, methyl ethyl ketone, and toluene were some of the analytes found <sup>4</sup>	Designated as dangerous waste for state-only persistence HOC content (140 ppm)  Did not designate for state-only toxicity via the rainbow trout fish bioassay

**No safer alternative assessment was identified.** A web-based literature research failed to identify any safer alternatives assessments of waterborne auto body paints<sup>5</sup>.

A hazard assessment using the Pharos Chemical and Materials Library<sup>6</sup> was attempted for some of the auto body basecoats (solvent and waterborne). This proved challenging because of the lack of full ingredient disclosure on manufacturer material safety data sheets (MSDSs) and lack of health and environmental data for some ingredients.<sup>7</sup>

Katy Wolf of the Institute for Research and Technical Assistance published a safer alternatives analysis of alternative thinners and gun cleaners (Wolf, 2008). The study had limited value for the LHWMP feasibility study since her analysis was an economic feasibility and performance assessment of products that were assumed to be safer alternatives and did not include a hazard assessment component.

**No ecolabels apply to auto body paints.** Ecolabels are a voluntary method of environmental performance certification. Products are awarded the right to use an ecolabel or certification mark upon meeting the program requirements developed by the Sponsor/Program Operator. No ecolabels were found that apply to auto body paints.

<sup>3</sup> The industry does not use chemical names consistently (e.g., N-propyl bromide is also called 1-bromopropane and methyl ethyl ketone is also called 2-butanone), so investigators must be aware of alternative names and be familiar with Chemical Abstract Service (CAS) numbers.

<sup>4</sup> After painting a car, excess unused paint from the gun cup is poured into a waste container. The gun is cleaned with a waterborne compatible gun cleaner, which is often comprised of deionized water. The used gun cleaner is then treated with a flocculant (i.e., flocculating agent). The flocculant causes paint particles to aggregate so they can then be filtered. The liquid filtrate can usually be reused and the dried paint sludge can be disposed of. The waste characteristics of the paint sludge depend on whether the pigments contain heavy metals or HOCs. The flocculant product appears to be potentially hazardous.

<sup>5</sup> The lack of peer-reviewed literature made it difficult to make confident assertions and made our feasibility study more dependent on industry literature.

<sup>6</sup> <http://www.pharosproject.net/material/>

<sup>7</sup> The Pharos Chemical and Materials Library provides results for 20 different health and environmental endpoints. In addition to data gaps, at the time of the assessment LHWMP had not developed a decision process (i.e., a ranking or scoring process) to compare results in order to determine which product is considered safer.

### **No evidence found to show low-VOC paints and gun cleaners are safer.**

Manufacturers began developing waterborne paints in response to impending regulations for volatile organic compounds (VOCs). Waterborne paints achieve compliance with VOC regulations by reducing solvent content. Low-VOC solvent-based formulations are also on the market. These low-VOC paints are produced using solvents that the United States Environmental Protection Agency (EPA) has exempted from the VOC regulations (e.g., acetone). No evidence-based studies of the effect these low-VOC paints have on human health or the environment could be located.

Similar to paint, no evidence-based studies were found demonstrating that low-VOC gun cleaners are safer. Wolf (2008) showed that acetone-based gun cleaners can be an effective alternative to high-VOC lacquer thinner, but the study focused on performance and cost, and was not a full alternative assessment.

## **Business Process Data Gaps**

**Waterborne paint system usage data is limited.** This study found that 10% or fewer of the 328 auto body shops in King County are currently using waterborne products. This estimate is based on data from a Puget Sound Clean Air Agency interview, manufacturer sales manager interview information, distributor interview information, and interviews with EnviroStar auto body shops. If the estimate is accurate, the relatively low current waterborne product use by King County auto body shops does present an opportunity for many more shops to switch to waterborne products if these products are determined to be a safer alternative.

Which shops are using what auto body painting product could not be determined. Other than getting this information from each individual shop, this information is not available. Project resources did not allow contacting every shop individually.

## **Attitudes and Barriers to Using Waterborne Paint Systems**

**Cost to switch to waterborne paint systems.** In addition to purchasing the waterborne paint system and waterborne-compatible consumables, the cost to switch from solvent-based to waterborne paint systems is shop-specific and depends on the need to update the spray booth, spray gun, and spray gun washer. Consequently, the cost may range from \$2,000 to \$25,000.

Solvent-based and waterborne paint systems may have different recurring costs. Waterborne paints generally cost more, but fewer coats are required and shops are expected to find cost savings by decreasing the time needed to complete each job. Other variable recurring costs differences might be waste disposal needs and energy use.

**Switching to waterborne paint systems has barriers.** Table 4 outlines barriers to switching from solvent-based to waterborne paint systems.

Table 4. Barriers to switching from solvent-based to waterborne paint systems
Cost (upfront and recurring costs, generally seems to be the most important concern)
Need to re-train painters in spray technique and waste management and storage strategies
Misconceptions about: <ul style="list-style-type: none"> <li>• Drying time (i.e., beliefs that it takes longer)</li> <li>• Availability of products (i.e., beliefs that only basecoats are available)</li> </ul>
Reluctance to change (Hults, 2009)

Interviews with EnviroStar shop owners revealed that local shops may not be accurately informed about waterborne paints. Some interviewees were not willing to switch to waterborne systems because they believe (incorrectly) that Seattle’s humidity would make the drying time too long and that only basecoats are available as waterborne coatings.

**Shops switched to waterborne paint systems for various reasons.** Based on this study’s findings and the literature (Stalder, 2009; Hults, 2009; EPA, 2008), Table 5 lists the reasons why shops have switched to waterborne paint systems.

Table 5. Reasons shops switched to waterborne auto body paint systems
Believe it is safer for workers’ health
Believe it is safer for the environment
Waterborne paint will likely be mandated in the future
Cost effective
Represents progressive business practices valued by customers
Waterborne is higher quality than solvent-based paint

**Shops trust non-government business advisors.** King County auto body shops generally seem to take advice about their business practices from manufacturers, jobbers, and distributors rather than government (Cleveland, 2011).

## Promoting Waterborne Paint Systems and Alternative Spray Gun Cleaners

**Advantages and disadvantages of switching to waterborne paint systems.** At this time, there is a dearth of peer-reviewed research on the environmental health and safety impacts of waterborne paint systems and alternative spray gun cleaners. While the use of waterborne paints will likely decrease VOC emissions, we have little other evidence to support claims that waterborne paints are safer than traditional solvent-based paints.

Table 6 lists the various advantages and disadvantages of promoting waterborne paint systems.

Table 6. Advantages and disadvantages of promoting waterborne paint systems	
Advantages	Disadvantages
Lower volume of solvent used; lower VOC emissions	Isocyanates still component of paint system
Less use of lacquer thinner for gun cleaning	HOCs and heavy metals may be in paint pigments
Potentially less hazardous waste generated	Flocculant used in gun cleaning process may be hazardous
Less workplace odor	Workers may not use PPE since low odor
Lower flammability hazard	Uses solvents lacking painter exposure assessments, e.g., 2-butoxethanol. Could result in replacing a solvent-based system product with something less safe.

**LHWMP’s role in promoting a shift.** Study findings show that education and financial assistance are probably LHWMP’s best choices for promoting the use of waterborne paint systems to King County auto body shops. This assumes that there is enough evidence that waterborne paint systems are safer and that the margin of safety is enough to make it of value to promote. Due to the diversity of this industry, equity concerns should also be considered.

Conversations with EnviroStar shops indicate that financial incentives could help motivate shops to switch. Most interviewees stated that they would like at least 75% of their conversion costs covered. Thus, the incentive amount could vary widely given that the cost to convert depends largely on the individual shop’s current equipment.

**Collaboration is likely important for LHWMP to be successful.** Cleveland (2011) interviewed auto body shop staff and concluded that shops do not trust government agencies as their primary source of information. To increase the chance for successful promotion of safer alternatives within this industry, LHWMP should partner with trusted voices in the automotive community. Automotive associations and local jobbers may be able to help distribute literature aimed at dispelling myths about waterborne coatings. Initial positive collaboration discussions have occurred with a local auto body paint training facility and the Automotive Services Association Northwest (ASA Northwest).

# Conclusions and Recommendations

## Conclusions

- No independent studies were found that have critically reviewed the occupational or public health risks associated with applying waterborne coatings.
- Reducing solvent use in the shop appears to be beneficial for occupational and ecological health.
- Waterborne paint systems can contain isocyanates, heavy metals, and HOCs.
- It is difficult to make a broad statement about the hazard/appropriate waste management of waterborne wastes. Waterborne products in general should not designate for ignitability, although at least one exception is known (a waterborne engine bay activator with a flashpoint of 104 °F). Metals and halogens that are components of the pigments are used in both waterborne and solvent-based products, so designations for toxicity and/or persistence may still be pertinent.
- Automatic, enclosed gun washers are considered best management practice to protect occupational health and minimize solvent releases to the environment.
- Gun washers that reuse cleaning solvents help minimize the quantity of hazardous waste generated<sup>8</sup>.
- Spray Technique Analysis and Research (STAR) training may reduce hazardous waste. The STAR training improves the efficiency of manual spray coating operations by enhancing the techniques of spray technicians. Decreasing the amount of overspray means that potentially less hazardous paint waste ends up on booth filters, rags, and other shop materials. If these materials are not contaminated by overspray, they may not need to be managed as hazardous waste.
- There is no single system that tracks waterborne coating use by King County auto body shops. LHWMP estimates that 10% or fewer King County shops are currently using waterborne coatings. This percentage is expected to increase as national VOC regulations continue to tighten and manufacturers continue to advertise waterborne systems as a high-quality alternative. Shops may adopt waterborne coatings without LHWMP's financial (or other) involvement.
- The major barriers to switching for smaller shops appear to be cost and misconceptions about waterborne paints.

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<sup>8</sup> Based on our interviews, “How do you manage your paint gun waste?” is not a clear question for businesses. Hazardous materials “management” is an LHWMP concept that is not understood by businesses.

- It would be difficult to determine how to conduct an equitable financial incentive program with this industry. The cost to switch is so variable from shop to shop, that individual assessments would be required. These assessments would require the assistance of a jobber.
- Although full safer alternative assessments are not available to confirm, it appears that there are safer low-VOC solvent alternatives available for lacquer thinner gun cleaners. Waterborne cleaners (e.g., tap water, deionized water, water-based solutions) appear to be even safer than the safer low-VOC solvent gun cleaner alternatives; however, some waterborne cleaners may need to be used in conjunction with a flocculant (flocculant is a potential occupational health hazard).
- Acetone-based gun cleaning products show promise and have proven effective and (sometimes) cost-effective as alternatives to high-VOC solvents (e.g., lacquer thinner) as thinners and cleaners. Acetone is low-VOC and considered relatively low-toxicity, but is highly flammable. No full safer alternative assessments were found.

## Recommendations

- Shops that convert to waterborne paint systems should test their waste stream(s) to determine whether the waste(s) designate according to federal and Washington state regulatory requirements.
- Waste streams from waterborne paint systems may designate as dangerous waste. LHWMP should take an active role in making sure these waste streams are properly managed or are not generated in the first place by encouraging manufacturers to manufacture and businesses to choose products that generate less hazardous waste (e.g., paints without heavy metal and HOC containing pigments).
- Waterborne paint systems appear to be comparable to solvent-based systems regarding cost, availability, and performance. LHWMP should participate in completing hazard and exposure assessments to facilitate decisions regarding the promotion of waterborne auto body paint technology (additional LHWMP sampling and an exposure assessment study is currently being conducted).
- LHWMP should consider promoting waste reduction systems and equipment, such as the Spray Technique Analysis and Research (STAR) system (in collaboration with PPRC), the 3M Paint Preparation System (PPS), and enclosed automatic spray gun washers.

- LHWMP should continue evaluating safer alternative spray gun cleaners and make a decision regarding promotion as an alternative to lacquer thinner (for shops that use solvent-based paint systems and products). LHWMP should consider revising EnviroStar guidelines to prohibit the use of lacquer thinner in (at least) 5-star shops. Explain to shops that “recycled” lacquer thinner is still hazardous.
- If a decision is made for LHWMP to promote waterborne paint systems, promotion should be in collaboration with a non-governmental organization and should include educational efforts to address misconceptions. LHWMP should continue supporting local shops that use a waterborne system to host demonstration sessions directed toward shop owners and painters.
- LHWMP should encourage the use of appropriate personal protective equipment (PPE) at shops using waterborne paint systems.
- LHWMP’s field teams should track business process data (e.g., which auto body shops are using waterborne coatings and which paint system is being used). The lack of data fields and systems to record business processes is a missed opportunity to capture data from LHWMP’s Business Field Team and others that would be useful to LHWMP as a whole.
- LHWMP should work with EPA’s Design for Environment program (DfE) and explore creating a DfE label for auto body paint system products.

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