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# Executive Summary

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## Wood Furniture and Cabinet Manufacturing, Repair, and Finishing

**April 2004**

Furniture manufacturing, repair, and finishing operations employ many different processes to create new products, repair existing goods, and finish new and existing pieces. Depending on the processes used, these businesses are often regulated by air quality agencies in addition to local public health departments. On a regional and national scale, past outreach and assistance has benefited not only local public health and air quality, but also has driven changes in industry practices and processes, ultimately leading to improvements in efficiency of production or finishing operations. This mutual benefit represents the ideal outcome for a technical assistance outreach campaign.

In the fall of 2003, the Thurston County Business Pollution Prevention Program invited furniture manufacturing, repair, and finishing businesses to participate in a voluntary technical assistance campaign. During the site visit, County staff ensured that each business understands its responsibilities under the Thurston County Nonpoint Source Pollution Ordinance. This ordinance requires businesses to provide adequate secondary containment for all hazardous materials and to dispose of or recycle hazardous wastes in a legal manner. During the visit, staff also presented general pollution-prevention and industry-specific best management practices and established a regulatory contact for future questions or concerns. County staff also informed businesses about new Washington Department of Ecology regulatory requirements for recycling or disposing of fluorescent light bulbs, which have been designated as universal wastes. Options for recycling or disposing of computer monitors and televisions, which are in an interim status being considered as universal wastes by Ecology, were also discussed.

Local businesses in this industry were primarily located through registration with the Olympic Region Clean Air Agency (ORCAA). Businesses emitting chemicals into the air through finishing, spraying, or other processes are required to register with ORCAA. Fourteen businesses were invited to participate in this voluntary campaign. During site visits, one business was discovered to be not operating.

Businesses participating in this campaign took many shapes and sizes. Four of the thirteen were engaged in relatively large-scale production; the rest were small, with some operating intermittently and from residential areas. These businesses also represented a spectrum of activities within the general industry, including production of school and business furniture; custom cabinet construction and finishing; reclining chair repair; and antique refinishing.

Ten best management practices (BMPs) were recommended during this campaign, including general pollution prevention practices, as well as some specialized practices developed by other agencies and industry associations. Several of these BMPs depended on the nature of the operation, and did not always apply to the entire set of businesses. These 10 BMPs addressed issues such as spill response, hazardous wastes disposal and recycling, product selection, and finishing equipment maintenance. Initial visits showed all 10 BMPs were currently in place in

over two-thirds of the thirteen businesses, with five of the 10 BMPs practiced in all applicable businesses.

One management practice highlighted by county staff dealt with the use of waterborne adhesives, coatings, and finishes. Waterborne products pose less threat to both public and environmental health, and can significantly reduce the amount of hazardous wastes generated by a business, potentially reducing disposal costs for the facility. Rags used with waterborne finishes can be washed and reused on-site, as opposed to contracting with a cleaning vendor. Spray-painting with waterborne paints also requires less day-to-day maintenance on spraying equipment than if solvent-based products were used.

However, there are barriers to acceptance of waterborne coatings by businesses. This industry is based on producing well-made and flaw-free products to attract new customers. Many business owners find that waterborne products produce a lower quality product than solvent-based products or that additional time and expense is required to produce a high quality finish. Research and experimentation by industry associations and individual businesses might identify process modifications or unique application specifications for waterborne products that produce comparable quality with solvent-based products.

At the time of the initial visits, eleven of the thirteen businesses were found to be operating in compliance with the Thurston County Nonpoint Source Pollution Ordinance. The two remaining businesses had minor waste management issues to improve. Follow-up inspections at these two non-compliant businesses verified proper disposal practices, and notices of compliance were issued.

As this was the first time Thurston County worked with the furniture business, this campaign provides a baseline for the number of businesses working locally, and the major challenges that they face in trying to incorporate less hazardous materials or processes into their operations. County staff may revisit this campaign in the future to see if this business sector has grown, identify any new practices that prevent pollution, or examine issues that increase public health risks.

For more information about the furniture manufacturing, repair, and finishing campaign, please contact Business Pollution Prevention staff at (360) 754-4111.

# Introduction

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The Business Pollution Prevention (BPP) Program, a project team within the Thurston County Environmental Health Division of the Public Health and Social Services Department, conducted a business technical assistance campaign for wood furniture and cabinet manufacturing and repair shops in Thurston County. The campaign was funded by solid waste tipping fees and a grant from the Washington State Department of Ecology.

In 2002, the Thurston County Business Pollution Prevention Program identified the wood furniture and cabinet manufacturing and repair industry as having received very little technical assistance in the past. Other than a few isolated complaints regarding waste disposal and some contact with a small number of these businesses about the use of the county owned Moderate Risk Waste facility, no technical assistance campaign had been conducted for this group of businesses. Therefore, it was determined that a technical assistance campaign for this industry was due. The campaign was conducted to ensure compliance with Article VI, Thurston County Sanitary Code and satisfy requirements of the Hazardous Waste Plan for Thurston County (January 1998).

In May 2002, Thurston County identified businesses thought to be manufacturing and/or repairing wood furniture or cabinets. The initial list was generated from various sources including the “yellow pages,” Washington State Department of Ecology’s list of moderate and large quantity generators and the health department’s existing files. This list was then compared to the list of permit holders for the Olympic Region Clean Air Agency.

Once the list of businesses was completed, the county contacted each business with an offer of free technical assistance. The technical assistance effort took place in August, September, and October 2003. The focus of the campaign was to educate business owners about compliance with Article VI, Thurston County Sanitary Code (also known as the Nonpoint Source Pollution Ordinance), to reduce hazardous waste generation, and to improve waste management practices. The Ordinance was designed to prevent pollution of water resources by requiring proper management of hazardous materials.

The Nonpoint Source Pollution Ordinance is based on the framework of the Washington State Dangerous Waste Regulations. This regulation is found in Chapter 173-303, Washington Administrative Code. Section –090 of the state regulation characterizes dangerous wastes (hazardous materials) as those solid wastes that exhibit any of the following characteristics.

- a. Ignitability: a fire hazard. Generally, a material with a flash point less than 60°C (140°F).
- b. Corrosivity: a solid or liquid with a pH of less than 2.0 or greater than 12.5.
- c. Reactivity: a material that reacts violently with water, generates toxic gases when mixed with water, is capable of detonation or explosive reaction if heated under confinement, or is capable of detonation or explosive reaction at standard temperature and pressure.

- d. Toxicity: a material that causes local or systemic detrimental effects in an organism, including asphyxiation, irritation, allergic sensitization, systemic poisoning, mutagenesis, teratogenesis, and/or carcinogenesis.

The businesses included in this campaign are classified as Small Quantity Generators (SQG) of hazardous wastes. Small Quantity Generators (as defined in WAC 173-303-070) may not generate more than 220 pounds of hazardous waste per month or batch, and may not accumulate or store more than 2,200 pounds at any time. Thurston County regulates only those businesses with SQG status, while the Washington State Department of Ecology regulates businesses with medium quantity generator (MQG) and large quantity generator (LQG) status.

# Goals

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The Business Technical Assistance and Education Campaign is an element of the Thurston County Business Pollution Prevention Program. Success of the technical assistance and compliance elements of the Business Pollution Prevention Program are measured by goals established in the 1998 Hazardous Waste Plan for Thurston County. The goals are:

1. Protect ground water, surface water, soils, sediments, and private property from hazardous materials and hazardous waste contamination.
2. Increase the rate of waste reduction, which conserves resources and reduces demand for disposal and recycling services.
3. Increase the percentage of hazardous waste collected (that cannot be prevented through waste reduction in the first place).
4. Reduce the amount of hazardous materials that is improperly stored, improperly disposed, and accidentally spilled into the environment.
5. Reduce damage to collection and transfer vehicles, and disposal equipment, and reduce disruption of treatment facilities by ensuring hazardous waste is kept out of these facilities or systems.
6. Reduce potential for causing publicly owned facilities such as the landfill or sewage treatment plants to exceed pollutant discharge limits.

# Methodology and Results

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For the purposes of this campaign, “wood furniture and cabinet shops” are defined as: businesses engaged in manufacturing and/or repairing wood furniture and cabinets. This includes, but is not limited to: specialty wood working shops, antique shops, custom facilities, second-hand stores, and manufactures of commercial office and professional furniture and fixtures. Businesses that only install furniture and cabinets (contractors) were not included in this campaign.

Twenty (20) businesses were initially identified that fit the category of “wood furniture and cabinet manufacturing and repair” and had the potential to use or store hazardous materials or produce a hazardous waste stream. Of these, six (6) were eliminated because they were found to not manage significant amounts (if any) of hazardous materials, did not conduct business in a central location (worked within customers homes), were not presently operating, or could not be contacted. A list of the businesses included in the campaign is in **Table 2**.

**Table 1: Basic Information**

Audience:	Furniture and Cabinet manufacturing and repair businesses
Project team:	Dave Tipton
Other agency partners:	WS DOE and Olympic Region Clean Air Agency (ORCAA)
Start and end dates:	July 2003 – November 2003
Geographic area served:	Thurston County
Funding source:	CPG and Tipping Fees

**Table 2: List of Sites Visited**

Site Name:	
AR Jorgensen	Mr. Oak
Bill Evans Furniture Repair	Nelson Furniture
Carras Cabinets	Ritter Custom Cabinets
Flory Cabinets	RT London Norse
Interior Wood Products	Phil Smith, Woodsmith
J. Garrison	Summit Lake Antiques
Martin Furniture	Whitcraft West

**Table 3: List of Sites that Refused Access**

None
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**Table 4: Audience Size**

Number of sites on initial list:	<b>79</b>
Number of sites intended for technical assistance visits:	<b>20</b>
Number of sites intended, but not visited because: - Business could not be contacted [3]; - Business was not currently operating [1]; - Business operates outside of the county [1]; - Business owner is on disability leave [1];	<b>6</b>
Number of sites that received a visit:	<b>14</b>
Number of sites that were referred to another agency:	<b>0</b>
Number of sites that refused to grant access:	<b>0</b>

**Table 5: Initial and Follow-Up Visits**

Number of initial technical assistance visits:	<b>14</b>
Number of follow-up technical assistance visits:	<b>2</b>
Number of compliance audits:	<b>0</b>
Number of follow-up compliance audits:	<b>0</b>
Number of total initial and follow-up visits:	<b>16</b>

**Table 6: Compliance Results**

<b>Compliance Status</b>	<b>At the time of the Initial Visit</b>	<b>After Follow-Up Visits</b>	<b>At the end of Campaign</b>
In compliance	<b>12</b>	<b>14</b>	<b>14</b>
Out of compliance	<b>2</b>	<b>0</b>	<b>0</b>
Pending compliance	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Sites</b>	<b>14</b>	<b>14</b>	<b>14</b>

**Table 7: Compliance Issues**

<b>Compliance Issue</b>	<b>At the time of the Initial Visit</b>	<b>After the Follow up Visit</b>
Secondary containment	<b>0</b>	<b>0</b>
Improper disposal	<b>2</b>	<b>0</b>
No disposal receipts	<b>0</b>	<b>0</b>
Other:	<b>0</b>	<b>0</b>
Other:	<b>0</b>	<b>0</b>
Other:	<b>0</b>	<b>0</b>
<b>Total Issues</b>	<b>2</b>	<b>0</b>

**Table 8: Secondary Containment and Proper Disposal**

Amount of secondary containment installed b/c of site visits (estimate)	<b>No additional secondary containment required</b>
Amount of hazardous materials verified to be safely stored (estimate)	<b>~ 500 gallons</b>
Amount of hazardous waste verified to be safely disposed (estimate)	<b>~ 220 gallons</b>

**Table 9: Comparison of Compliance Rates from Previous Campaigns**

<b>Category</b>	<b>Total</b>
Businesses previously inspected before this campaign	4
Previously inspected sites that were in compliance at initial visit	4
Previously inspected sites that were out of compliance at initial visit	0
Businesses not previously inspected before this campaign	10
Not previously inspected and refused access	0
Not previously inspected and were in compliance at initial visit	8
Not previously inspected and were not in compliance at initial visit	2

**Table 10: Best Management Practices**

<b>Best Management Practice (BMP)</b>		<b>Number who are already doing?</b>	<b>Number of Times Suggested?</b>	<b>Number of Times Implemented?</b>
<b>1</b>	Keep chemical wastes segregated	12 (of 12 sites)	0 (of 12 sites)	
<b>2</b>	Prevent spills	13 (of 13 sites)	0 (of 13 sites)	
<b>3</b>	Properly manage shop rags and towels	13 (of 13 sites)	0 (of 13 sites)	
<b>4</b>	Used water-based glues and contact cements	13 (of 13 sites)	0 (of 13 sites)	
<b>5</b>	Store chemicals properly	13 (of 13 sites)	0 (of 13 sites)	
<b>6</b>	Use spigots and funnels to reduce spills	4 (of 5 sites)	1 (of 5 sites)	
<b>7</b>	Spill kit materials on hand	11 (of 13 sites)	2 (of 13 sites)	
<b>8</b>	Recycle or distill all waste gun wash solvents	8 (of 12 sites)	4 (of 12 sites)	<b>4 (of 4 sites)</b>
<b>9</b>	Flush equipment with dirty solvent, then virgin solvent	5 (of 6 sites)	1 (of 6 sites)	
<b>10</b>	Recycle fluorescent lights, HID lamps and CRTs	0 (of 13 sites)	13 (of 13 sites)	
<b>Total BMPs</b>		<b>92 BMPs in place</b>	<b>21 BMPs suggested</b>	<b>4 BMPs implemented</b>

**Note: Not all best management practices were applicable for all sites visited**

**Table 11: Customer Survey Response**

Thirteen surveys were handed out to businesses and seven surveys were returned.

	<b>Yes</b>	<b>Somewhat</b>	<b>No</b>	<b>N/A</b>
1. Did the visit(s) provide you with helpful information on the proper management and reduction of hazardous products and waste?	<b>5</b>	<b>2</b>		
	<b>Yes</b>	<b>Somewhat</b>	<b>No</b>	<b>None needed</b>
2. Did the visit assist you in making changes in your hazardous materials management practices?	<b>2</b>			<b>5</b>
	<b>Yes</b>	<b>Somewhat</b>	<b>No</b>	<b>N/A</b>
3. Was the specialist knowledgeable?	<b>7</b>			
	<b>Yes</b>	<b>Somewhat</b>	<b>No</b>	<b>None to address</b>
4. Was the specialist willing to help you solve your specific problems?	<b>2</b>	<b>1</b>		<b>4</b>
	<b>Very</b>	<b>Somewhat</b>	<b>None received</b>	<b>N/A</b>
5. How informative were the fact sheets/materials you received during the visit?	<b>1</b>	<b>2</b>	<b>4</b>	

The following table sections depict the average rankings of each answer choice, as ranked by the business owners and managers completing the surveys. (N= 6 surveys)

	<b>Disposal Costs</b>	<b>Worker safety, liability</b>	<b>Information locations</b>	<b>Meaning of regulations</b>	<b>Time required</b>	<b>Equity among businesses</b>
6. As an owner/employee of a small business, what concerns you most about proper hazardous waste management?	<b>Most Important.....Least Important</b>					
	<b>Concern for local resources</b>	<b>Health and safety</b>	<b>Spill avoidance</b>	<b>Information locations</b>	<b>Enforcement avoidance</b>	<b>Other</b>
7. What was your primary incentive for participating in the technical assistance visit?	<b>Highest Incentive.....Lowest Incentive</b>					<b>N/A</b>
	<b>Hazardous waste recycling</b>	<b>News bulletins</b>	<b>Business Waste Hotline</b>	<b>Workshops and trainings</b>	<b>Public recognition</b>	<b>Trade show info.</b>
8. If the County provided the following services, PLEASE RANK THEM in the order in which you would use them.	<b>Most Likely to Use.....Least Likely to Use</b>					

9. Where do you get your information on hazardous materials management?  
**Safety equipment suppliers, state news bulletins, trade publications, Department of Ecology, other business owners, workshops, pollution authorities.**

	Quarterly newsletter	Topic-specific fact sheets	Newspaper articles	Letters about upcoming events	Trade show ads	Other
10. How would you prefer to receive information on hazardous waste services, pollution prevention, changes in regulations, etc?	<b>Highest preference.....Lowest Preference</b>					N/A

11. Please share any other comments you may have about the Furniture/Cabinet Technical Assistance Campaign, or offer suggestions for improvement.  
**“A worthwhile program – keep it up!”**

	Yes	No
12. Did you know that the County offers a hazardous waste recycling and disposal site for small businesses prior to the visit?	<b>3</b>	<b>3</b>

# Campaign Evaluation

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**How did the project meet the goals of the regional Hazardous Waste Plan?  
Give specific examples if possible.**

- 1. Protect ground water, surface water, soils, sediments, and private property from hazardous materials and hazardous waste contamination.**
  - Verified all hazardous materials (approximately 500 gallons) properly stored in secondary containment and labeled.
  - Verified that approximately 220 gallons of hazardous wastes were properly disposed through regular vendors or local materials disposal services.
  - No additional secondary containment was required.
  - No excessive quantities of hazardous materials or wastes were noted.
  
- 2. Increase the rate of waste reduction, which conserves resources and reduces demand for disposal and recycling services.**
  - Encouraged use of water-borne coatings.
  - Noted an almost exclusive use of water-borne adhesives. Exceptions included use of epoxies or acrylics for high stress joints where bonding and filling is required, i.e., repair of chair legs.
  - Recommended the use of reusable shop towels stored in proper containers as a substitute for use of disposable shop towels, which are air-dried prior to disposal. This practice reduces hazardous air pollutants and encourages reuse of this resource.
  - Commercial manufacturers using laminates largely use water-borne adhesives or order sheeting materials already pre-laminated. Solvent-based adhesives are rarely used and only for specialty applications.
  - Most businesses are using conversion varnish (a catalytic reaction based coating) instead of solvent-based varnishes and shellacs.
  
- 3. Increase the percentage of hazardous waste collected (that cannot be prevented through waste reduction in the first place).**
  - Required two commercial manufacturers to properly collect and dispose of paint thinner wastes instead of soaking it into sawdust and disposing as solid waste.
  - Recommended recycling for management of fluorescent lamps, and CRTs.
  
- 4. Reduce the amount of hazardous materials that is improperly stored, improperly disposed, and accidentally spilled into the environment.**
  - Required two commercial manufacturers to properly collect and dispose of paint thinner wastes instead of soaking it into sawdust and disposing as solid waste.
  - Recommended recycling for management of fluorescent and HID lamps, and CRTs.

**5. Reduce damage to collection and transfer vehicles, and disposal equipment, and reduce disruption of treatment facilities by ensuring hazardous waste is kept out of these facilities or systems.**

- All businesses are now aware of proper hazardous waste disposal. Several are already registered users of HazoHouse and are regular users.
- Two businesses changed disposal methods for paint thinner wastes. Now it is collected and disposed of as hazardous waste instead of solid waste.

**6. Reduce potential for causing publicly owned facilities such as the landfill or sewage treatment plants to exceed pollutant discharge limits.**

- Required two commercial manufacturers to properly collect and dispose of paint thinner wastes instead of soaking it into sawdust and disposing as solid waste.
- Recommended recycling for management of fluorescent and HID lamps and CRTs.

# Conclusions and Recommendations

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## What were the most important things learned about this audience?

- As a group, the wood furniture and cabinet manufacturing and repair industry in Thurston County complies with Article VI, the Nonpoint Source Pollution Ordinance.
- As a group, the wood furniture and cabinet manufacturing and repair industry in Thurston County generates very little hazardous waste.
- The wood furniture and cabinet manufacturing and repair industry in Thurston County is generally aware of environmental protection rules and regulations through contacts with the Environmental Protection Agency, Washington State Department of Ecology, Olympic Region Clean Air Agency and the Thurston County Public Health and Social Services Department.
- Federal air pollution laws have primarily driven environmental changes within this industry. Reduction and elimination of Hazardous Air Pollutants (HAP) by this industry is the one single factor which lead to less-toxic alternatives such as water-based coatings and adhesives.
- Universal waste regulations are new to this industry. Most businesses are aware of the concerns regarding mercury but were not aware of the new management regulations. All businesses say they are willing to properly manage these wastes.
- Sending periodic reminders about fluorescent light and CRT recycling and disposal options would reinforce the best management practices.

## What were the common waste streams and how were they managed?

- Ignitable Liquids (thinners and solvents): managed as a hazardous waste.
- Paint Related Materials (paint waste, thinner sludges, stripper sludges, adhesive waste, etc.): managed as a hazardous waste.
- Shop Towels: large facilities manage as a hazardous waste; small facilities manage as a solid waste.
- Universal wastes – fluorescent and HID lamps: previously managed as a solid waste, now managed as a universal waste.

- Filters (paint, spray booth, respirator): managed as a solid waste. Do not designate as a hazardous waste as coating containing metals are not used.
- Wood Debris and Saw Dust: managed as a solid waste. Economical recycling opportunities do not exist in Thurston County as this time.
- Solid Wastes (paper, tape, sandpaper, etc.): managed as a solid waste.

**What improvements would you recommend for future campaigns with this audience?**

- Continue to emphasize water-based coating as a substitute for solvent-based coatings.
- Continue to emphasize use of non-disposable shop towels along with commercial laundering to reduce hazardous air pollutants.
- Emphasize continued training of personnel who apply spray coating in the proper techniques to reduce over-spray and air pollution. Perhaps a training session by Ecology would be well received.

# Acknowledgments

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Patti Swanson, Clerk of the Board

## Thurston County Public Health and Social Services Department

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## Other Agency Participants

Washington State Department of Ecology – Margit Bantowsky, Toxics Reduction Unit  
Olympic Region Clean Air Agency – James Wilson, Emissions Data Specialist II

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The Thurston County Hazardous Waste Program serves small businesses in Thurston County and the communities of Bucoda, Lacey, Olympia, Rainier, Tenino, Tumwater, and Yelm.

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