Evaluation of the Performance of Recycled Content Latex Paint in Connecticut

In 1997, the Environmental Protection Agency (EPA), in conjunction with the Waste Watch Center (WWC) of Haverhill, Massachusetts and the Connecticut Department of Environmental Protection (DEP), conducted a demonstration program for recycled content paint. The purpose of this program was to determine if recycled content latex paint could meet basic performance standards for application and wear. A number of sites used the recycled content latex paint in 1997 and 1998. In the summer and fall of 2001, DEP surveyed the sites that used the paint and visited several of them. The results give a strong indication that recycled content paint can compete with comparable virgin paints in performance and durability.

Background

Many Connecticut residents have leftover cans of paint in their basements and garages. Homeowners are often confused about what to do with this old, unwanted paint. If the paint is usable, they may try to donate it to a local charity or theater group. Oil-based paints are accepted at household hazardous waste collections where they are usually bulked and used as a fuel.

However, latex paints are not usually accepted at household hazardous waste collections because manufacturers removed hazardous metals such as mercury and lead a number of years ago. In addition, many waste haulers won't accept latex paint in the regular trash unless it has been dried out. Latex paint can be recycled if there is sufficient demand. The challenge for recycling latex paint is to find markets to close the loop. By overcoming the myths that recycled content paint is inferior, expensive and that people won't use it, new markets can be created and demand increased.

In addition to demonstrating that recycled content paint is comparable to virgin paint, DEP staff is working with municipalities to establish collection centers for both latex and oil-based paints. Avon, Essex, Barkhamstead, New Hartford, and Winchester offer places for their residents to drop off paints on an ongoing basis. These centers can provide a steady supply of feedstock for recycled content paint as well as source of donated and reused paint.

Metro Portland Oregon conducts their own latex paint collection and recycling program. From 1992 through August of 2000, the program accepted over half a million gallons of unwanted latex paint and produced 300,000 gallons of recycled content paint. The paint is sold in 5-gallon containers for $4 - $5 per gallon - much cheaper than a comparable virgin paint.

One of the major concerns with recycled content paint is its performance. Since the major manufacturers don't sell recycled paint, there is not a long track record. Purchasing officials and painting contractors need to feel comfortable that they are using good quality paint. The challenge therefore is to convince purchasing officials and painting contractors that recycled content paint is comparable in quality and performance to virgin paint, regardless of the application.

The Demonstration Program

The demonstration program consisted of seven steps:

1) Developing a specification for recycled content latex paint
2) Selecting a vendor or vendors to supply the recycled content latex paint.
3) Identifying sites to demonstrate the paint
4) Developing evaluation criteria and forms
5) Applying the recycled content paint
6) Presenting the initial findings to municipal and state purchasing agents
7) Re-evaluating the wear of the paint after three to four years.

1) Specifications for Recycled Content Latex Paint

The WWC developed a specification for recycled content latex paint (Attachment A). The purpose of developing a specification was to make certain that proposals from manufacturers could be evaluated on equal terms. For example, the specification for recycled paint required a minimum 50% post consumer content. The specification also set standards for odor, viscosity, opacity, and metal content. The specifications are similar to those for comparable virgin paints. Purchasing agents can use these specifications if they are considering recycled content paint.

2) Vendor Selection

WWC developed a request for proposals and coordinated the bid process. After a careful review of four bids, WWC selected two vendors; Paint Solutions of Missouri, and Focus Recycling of New Jersey.

3) Identifying Sites

The DEP contacted several state parks and municipalities about using the paint. State parks were chosen because they are considered more visible to the public and easier for DEP to monitor. However, most of the outdoor applications at state parks use oil-based stains and not latex paint. There were a few state park locations that indicated they did use latex and would be willing to demonstrate the paint. In addition, a number of towns identified sites that could use the recycled content latex paint. Some of the state park sites initially accepted the paint but then did not have the time or staffing to paint. Some of this paint was then given to municipalities.

Table 1. Recycled Paint Demonstration Sites

Location	Painted	Date
Sherwood Island State Park, Westport	Outdoor railing and beams near snack bar. (Metal)	Summer 1997
Mansfield	Outdoor frame for bus stop. (wood)	Summer 1997
Newtown	Town Hall meeting room.	Spring 1998
Harwinton	Police Department meeting room	Summer 1997
New Britain	Outdoor storage trailer (metal)	Summer 1998
Harkness Memorial State Park, Waterford	Men's employee bathroom	Summer 1998
New Haven	Vestibule of alternative incarceration program	Summer 1998
Montville	Town Garage (cinder block)	Summer 1998

Branford	Ceiling and concrete block	Summer 1998
Barkhamstead	Dumpster and building exterior	Summer 1997

The sites that were selected to receive the recycled content paint and were looking to match a specific color (e.g. the blue railing at Sherwood Island State Park), submitted paint chips. These chips were then sent to the paint manufacturer to try and match. This demonstrated that the recycled content paint could be tinted to match existing colors.

4) Developing Evaluation Criteria

WWC and DEP developed an evaluation form for the persons applying the paint to fill out to assess the performance during and just after application. The form asked for objective data such as the type of surface to be painted, application method, color, and how the surface was prepared. It also asked for subjective data on the consistency of the paint, how it went on and how it dried. The participants were also asked how the recycled content paint compared to comparable virgin paints. See Attachment C for the evaluation form.

5) Appyling the Recycled Content Paint

Painting began in the summer of 1997. DEP staff visited four of the sites, Montville, Mansfield, Barkhamstead, and Sherwood Island while they were being painted. In Montville, the painters reported problems with the paint clogging a sprayer. However, these were not professional painters and the problem may have been with the sprayer itself.

In Barkhamstead, there was a problem with the color. The paint manufacturer developed a shade of red for the town to use on a metal dumpster. The town did not like the shade. The manufacturer then added tint to darken the color. This created problems with adhesion. Eventually everything was worked out and the town used the paint on a building.

There were no other problems noted in the application of the paint. The paint was used on drywall, wood and metal surfaces, interior and exterior. The paint covered and adhered well. The drying time was similar to virgin paints and the sites using it reported generally that it performed the same as a comparable virgin paint on all surfaces.

Table 2. Results of Application Stage Survey

Question	Yes	No
Any noticeable odor?	0	8
Apply easily?	8	0
Dried within two hours?	8	0
Uniform consistency after mixing?	7	1
Dried to smooth finish?	8	0

6) Presenting Results

In September of 1997, DEP, EPA and WWC gave a workshop on recycled content paint for the benefit of local, regional and state purchasing agents. The workshop provided information on the performance of recycled content paint, the specification, manufacturers and price. The paint manufacturers

In March of 1999, the cost for HHW programs to recycle latex paint under Minnesota's State Hazardous Waste Management Contract was $2.64

spoke about their product and the group toured the Avon Transfer Station where recycled paint was used on a storage barn. DEP staff also presented the preliminary results of the evaluation form filled in by the demonstration sites.

7) Re-evaluating the Performance of the Recycled Content Latex Paint after 3-4 Years

One of the common myths about recycled content paint, as with other recycled content products, is that it is of inferior quality. In fact, the staff at the Sherwood Island State Park demonstration site indicated they felt the paint "will not hold up to the weather conditions" in their initial assessment in 1997.

The initial application phase of the demonstration project indicated that recycled content paint applied comparably to virgin paint. However, the real test would come over time. How does the paint perform over its normal lifetime?

DEP staff surveyed the users of the recycled content paint and visited several of the sites in 2001 to find out how the recycled paint was performing. The respondents indicated overwhelmingly that there were no problems with the performance of the recycled content paint. Participants were pleased with the way the paint performed, with only one or two reported concerns.

Only one participant indicated they were "not sure" if they would buy the recycled content paint. They reported some problems with peeling on the wood surface but not on the cement. This could be due to the surface preparation. Some of the paint used at this site was not part of the grant and was purchased by the participant. The paint they purchased may not have met the specification for recycled paint purchased under this demonstration program.

Another participant indicated they thought the color may have faded. But this site was a barn with three years of full sun. The participant indicated however in a personal interview that they were pleased with the performance of the paint and felt a virgin paint would have faded in the same way.

The Sherwood Island State Park site was a good test for the paint. The paint was used on metal railing and fencing at a concession stand roughly one hundred yards from the ocean, exposed to winds and salt air. The paint has held up over the years. There was limited peeling and cracking, related to vandalism and where the surface was not prepared well. Because there wasn't enough paint to complete the painting of the railing, one could easily notice where the recycled content paint was used. The older paint was much more faded and cracked. As indicated in the survey, park maintenance staff was very pleased with how the paint performed.

Table 3. DEP Phone Survey of Recycled Paint Demonstration Sites

Demonstration Site/ Date Painted	How is Paint holding up?	Would you use it again?	Comments
Avon – August 1997	"fine but it faded a little"	Yes	"Performed as well as regular paint"
Harkness State	"no	Yes	"There are no problems or concerns.

Park, June 1998	problems"		Would be happy to use the paint again."
Sherwood Island State Park, June 1997	"It is the same as when it was painted"	Yes	"It looks great and is attractive" "It is comparable to virgin paint".
Harwinton June 1997	"fine"	Yes	"…when the paint first went on the odor was strong" "Was a positive experience and liked that the paint was less expensive (than virgin)."
Branford August 1998	"no problem"	Yes	"It is attractive and looks like regular paint." "It is comparable to virgin paint. There is no difference".
New Britain Summer 1998	"Great"	Yes	"It is not cracking, no bubbles or scraping off."
Mansfield June 1997	"fine"	Yes	"the same as a medium virgin paint"
Montville June 1997	"Fine on cement, on the wood it is scraping off"	Not Sure	"On the wood the paint scraped off but the virgin paint might of peeled off the wood anyway."
Newtown June 1998	"no problem"	Yes	"We're very pleased with it"

Summary

Latex paint can be recycled. There is a steady supply of paint that can be processed into recycled paint. Recycled content paint is cost competitive with virgin paint too. The main problem with closing the loop is getting people to purchase recycled content paint. This problem is largely the result of misperceptions about the quality of recycled content paint and the need for a specification.

This program provided a specification for recycled latex paint and demonstrated that it is comparable to virgin paint in application and wear. The sites that used the paint were happy with its performance, reported few problems and indicated they would be interested in purchasing more.

Recycled content paint can be used in any application where virgin paint is used. The recycled paint was used in both exterior and interior applications, as well as on wood, drywall, concrete and metal surfaces. The quality of recycled content paint is comparable to virgin paint. Some applications require only a cheap, low-grade paint, others require a medium grade, and still others a higher grade. Whatever the grade, recycled content paints can compete with virgin paints in quality and price.

Appendix A – Pictures of Demonstration Sites

Figure 1 - Avon Garage

Figure 2 - Newtown Town Hall Office

Figure 3 Sherwood Island State Park

Appendix B – Recycled Latex Paint Specification

Characteristics	Requirements
Post-Consumer Content	greater than or equal to 50%
Maximum Pb Levels	less than or equal to 600ppm
Maximum Hg levels	less than or equal to 50ppm Type I, III less than or equal to 100ppm Type II
Odor	not irritating, none after 48 hours
Freeze-thaw stability	less than or equal to ? 8KU after 3 freeze-thaw cycles
Application properties (per FED-STD 141, method 2141, 2112, and 2131	Shall brush, roll or spray easily and dry to a smooth uniform film, free from lap marks, excessive brush marks, orange peel, craters, or dusting.
Dry through, dry time (per ASTM D-1640	Less than or equal to 2hrs for flat and eggshell Less than or equal to 8 hrs for semigloss
Consistency, Viscosity	80-100 KU
Reflectivity, Dry Opacity	0.92 – 0.98 minimum
Flexibility	¼ inch
Scrub resistance	Greater than or equal to 300 cycles
Total solids, % vol. of paint	Greater than or equal to 40%
Fineness of Dispersion, Grind	Greater than or equal to 3 for Flat Greater than or equal to 4 for Eggshell or Semigloss
Sag	NA
60° Gloss	Less than or equal to 6 for Flat 15 – 25, Eggshell 30 – 50, Semigloss
pH	NA
Shelf life	No less than 12 months from date of delivery
Color (per ASTM D2244)	Within ? E 2.5
Other	MSDS required, Label with: name and address of the manufacturer, batch or lot number, date of manufacture, kind of paint, use intended, directions for application, and “Do Not Freeze”.

Recycled Paint Performance Evaluation Form

Town:

Project Contact: _____ Phone:

Site Address:

Type of Structure:

Surface Type: Wood Metal Other:_____

Amount Ordered: _____ Gallons Color:

Application Method: Brush Roller Sprayer

Paint Manufacturer:

Preparation

How was the surface prepared prior to application?

What were the weather conditions while painting?

Who did the painting? professional painters seasonal help town employees

What was the surface color prior to painting?

Performance

Was there any exceptional or irritating odor associated with the recycled latex paint?
Yes No

Did the paint brush, spray or roll on easily? Yes No

Did the paint dry to a smooth, uniform film, free from lap marks, excessive brush marks, orange peel (uniform pores) or dusting (chalkiness, brushes off, non-adhesion)?
Yes No

Problems:

Did the paint dry within two hours for flat or eggshell and within 8 hours for semi-gloss?
Yes No

How many coats were applied?

Was the paint a uniform consistency after mixing? Yes No

	Exceptional		Fair		Poor
How well did the paint cover?	1	2	3	4	5
How would you rate quality?	1	2	3	4	5

How does the paint compare to virgin paints? Better Comparable Worse

Any other comments about the paint?