



Memo

Date: January 30, 2008
To: Kris Beatty, King County Solid Waste Division
From: Katie Kennedy
Re: Results of Polystyrene Research

This memo provides background information to aid King County LinkUp program staff in determining whether to target expanded polystyrene (EPS) for increased recycling in 2008. Current recycling conditions in Washington, Oregon and California are described, including estimated volume of material, end markets, concerns with recycling, and local recycling opportunities.

Common uses for this material are disposable food packaging (e.g., cups, plates), building insulation panels, molded packaging material, and packing “peanuts.”

Amount of EPS Disposed

By weight, EPS makes up less than 1% of the King County waste stream. By volume, though, this material represents a substantial amount of disposed waste. Approximately 3,974 tons of expanded polystyrene are disposed annually in King County, excluding Seattle.¹ To calculate a volume estimate for this quantity, we used a density factor of 32 pounds per cubic yard.² The volume equivalent of that amount is about 248,000 cubic yards.

Washington, Oregon and California Recycling Opportunities & End Markets

Web searches for local recycling opportunities resulted in a short list of companies that included PC Plastics in Portland, as well as a list of EPS recycling drop off locations across the US maintained by the Association of Foam Packaging Recyclers (AFPR). Cascadia attempted to interview a representative of each business identified as a recycling collector or processor of EPS foam.

Washington

A phone conversation with the only Washington listing, Earthworks Recycling in Spokane, revealed that they accept foam packing peanuts for reuse, but do not accept any other foam products or engage in any processing of foam materials.

¹ King County Monitoring Program 2002-2003 Waste Characterization Study and Customer Surveys, April 2004. Prepared by Cascadia Consulting Group, Inc. Pg. 28.

² California Targeted Statewide Waste Characterization Study: Detailed Characterization of Construction and Demolition Waste. June 2006. Prepared by Cascadia Consulting Group, Inc. Pg. 63.

Oregon

Oregon has several drop-off opportunities for molded packaging foam.

- **Tegrant Corp (Wilsonville, OR).** A phone conversation with a representative of Tegrant Corp. confirmed that they accept EPS that is dropped off. However, that material is subsequently moved to PC Plastics for processing and, according to the interviewee, PC Plastics is experiencing financial difficulties and is no longer accepting material. As a result, Tegrant is seeking a new processor, and recommended Olympic Foam as a business that might be processing material, but that was not interested in accepting Tegrant's material. Follow up with Olympic revealed that they do not accept any foam resins for recycling. It appears likely that currently there are no processing facilities for foam recycling in Washington or Oregon.
- **PC Plastics (Portland, OR).** According to the PC Plastics website, they offer commercial collection services for expanded polystyrene (EPS), expanded polypropylene, and expanded polyethylene, as well as three remote drop-off locations. A representative of PC Plastics reported that they are still accepting EPS.³ After grinding the material, it is fed into an extruder where it is heated and formed into long threads. The threads are then cut to form pellets. They sell the pellets to injection molding companies, such as manufacturers of construction parts and cosmetics cases.
- **NextStep Recycling (Eugene, OR).** Next Step Recycling, located in Eugene, OR, collects EPS, compacts it in a compressor, and trucks to a company, Timbron, in Stockton, California for processing.⁴ At Timbron, the compressed EPS is shredded into flakes, and then extruded into pellets to form a raw material for their product.⁵ Timbron manufactures an interior moulding product that contains 90% recycled polystyrene, both EPS and high-impact polystyrene (HIPS).
- **Denton Plastics (Portland, OR).** Denton Plastics accepts EPS from industrial sources.⁶ Similar to PC Plastics, Denton melts down the EPS and makes plastic pellets that are then sold to injection molders. They were not aware of the specific products that are made by their buyers.

California

California contains the greatest number of drop off locations for EPS recycling of the three states. The 10 locations identified as members of the AFPR are:

Name	City
Astrofoam Molding	Camarillo
Nepco	Chino
FP International	Commerce
Foam Fabricators, Inc.	Compton
Ability Counts, Inc	Corona
Topper Plastics	Covina
Agri-Cel	Delano
APTCO, LLC.	Delano
Styrotek, Inc.	Delano

³ Gogol, John. PC Plastics. Phone conversation. 11/20/07. (503) 720-7689

⁴ Representative from NextStep Recycling. Phone conversation. 11/21/07. (541) 686-2366

⁵ Timbron company website, <http://www.timbron.com/tour1.htm>

⁶ Hoyer, Daniel. Denton Plastics. Phone conversation. 11/21/07. (503) 257-9945

Of these ten companies, two were reached for interviews. Cascadia also attempted to contact Timbron International in Stockton, which was identified as the processor for EPS collected by PC Plastics in Oregon.

While most did not respond to telephone inquires, representative from two companies were able to provide information:

- **Astrofoam, Inc.⁷ (Camarillo, CA).** Astrofoam is a manufacturer of foam packaging containers. They accept clean, white EPS only by drop-off, which they regrind and process on site. They estimate that recycled foam makes up about 5% of their final product. The foam they recycle comes mostly from residents, and while they do not have any remote drop off locations, they report that residents drive to their facility from as far away as Los Angeles.
- **Nepco⁸ (Chino, CA).** Nepco produces a variety of polystyrene products at their factory in Korea, and will be opening another factory in Mexico this year. They also manufacture foam recycling machines that process EPS into polystyrene ingots. Nepco sells these machines to outside organizations, then purchases the ingots that are produced, pelletizes them at their California facility, and ships the pellets to their Korean factory for production. They also accept loose foam (EPS only) that is dropped off at the Chino facility, but do not purchase it from any other sources.

While the other companies could not be reached by phone, the following information was obtained through Internet research:

- **FP International⁹ (Commerce, CA).** FP produces a variety of polystyrene packing materials. They accept clean EPS from both residents and businesses, though all customers must call ahead before delivering material. The material is used to manufacture loose fill packaging (foam packing peanuts).
- **Topper Plastics¹⁰ (Covina, CA).** Topper produces EPS packaging products. They accept drop offs of EPS foam at their plant, and include recycled foam in all of their products. Their recycling facility can process 1,000 pounds of EPS per hour.
- **Timbron International¹¹ (Stockton, CA).** Timbron produces polystyrene nonstructural building materials. They accept any clean block foam that is labeled #6 at their Stockton facility. The material can be dropped off or mailed. In addition, they can accept other polystyrene resins, such as General Purpose Polystyrene and High Impact Polystyrene provided prior authorization is obtained.

Environmental or Health Concerns with EPS Recycling

Our research did not reveal any environmental or health issues related specifically to recycling of EPS. The adverse impacts from EPS result during the production of virgin EPS, rather than conversion to new products. Benzene, ethyl benzene, and the monomer styrene are used in

⁷ Representative from Astrofoam, Inc. Phone conversation. 1/24/08. (805) 482-7276.

⁸ Te, John. Nepco. Phone conversation. 1/25/08. (909) 627-8081.

⁹ FP International company website, <http://www.fpintl.com/RECYCLE-MAIN.htm>

¹⁰ Topper Plastics company website, <http://www.topperplastics.com/recycling.html>

¹¹ Timbron International company website, <http://www.timbron.com/recycler.htm>

the production of polystyrene and are all known or suspected carcinogens.¹² Styrene is also a known neurotoxin.

The Institute for Local Self-reliance (ILSR), the parent organization for the Healthy Building Network, is focusing on bioplastics and compostable bio-products as alternatives to what they consider to be the three most toxic plastics: polyvinyl chloride (PVC), polycarbonate, and polystyrene.¹³ If a type of polystyrene were to be promoted, a representative from ILSR reported that non-food polystyrene packaging recycling was preferable to polystyrene food packaging.

For a more thorough investigation, we recommend that a “process assessment” could be undertaken to analyze the specific processes being used for recycling and re-manufacturing to analyze environmental and health implications.

Seattle’s Experience with EPS

Seattle Public Utility is not considering a recycling program for EPS. According to a representative, their priorities are typically driven by the amount of the waste stream a material makes up, by weight.¹⁴ When it comes to packaging, they encourage waste reduction, rather than recycling.

SKCAC Operation in Kent, WA

We contacted Peter Christiansen of the Washington State Department of Ecology to obtain his perspective on SKCAC, a potential new recycling operation, based on a recent tour he participated in.¹⁵ Peter reported that SKCAC, which is a sheltered workshop, appears to be very organized. He thought that the owner of SKCAC is enthusiastic and experienced, and has done a lot of research into pursuing a recycling operation. The interviewee suggested that a good business model would be back-hauling EPS from electronics retailers (e.g., Circuit City) to supplement SKCAC’s current supply from their packaging and sorting operations.

¹² Platt, Brenda; Tom Lent; and Bill Walsh. The Healthy Building Network’s Guide to Plastic Lumber. October 2005, 2nd Edition. http://www.healthybuilding.net/pdf/gtpl/guide_to_plastic_lumber.pdf

¹³ Platt, Brenda. Phone conversation. 11/21/07. (202) 898-1610

¹⁴ Gannon, Tom. Seattle Public Utilities. Phone conversation. 11/20/07. (206) 684-3453

¹⁵ Christiansen, Peter. Washington State Department of Ecology. Phone conversation. 11/20/07. (425) 649-7076