



sanitation

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December 31, 2014

Honorable Bill de Blasio
Mayor, City of New York
City Hall
New York, New York 10007

Honorable Melissa Mark-Viverito
Speaker, New York City Council
City Hall
New York, New York 10007

Honorable Antonio Reynoso
New York City Council
Chair, Committee on Sanitation and Solid Waste Management
250 Broadway, Suite 1740
New York, NY 10007

Re: Local Law No. 142 of 2013 Determination

Dear Mayor de Blasio, Speaker Mark-Viverito and Councilmember Reynoso:

Local Law No. 142 of 2013 ("LL 142") mandates that the Commissioner of Sanitation make a one-time determination about the recyclability of expanded polystyrene, commonly known as foam, by January 1, 2015. As such, I submit to you my determination on the recyclability of expanded polystyrene as required by LL 142.

Sincerely yours,


Kathryn Garcia

c: B. Anderson
R. Orlin

Encl. Determination on the Recyclability of Expanded Polystyrene

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MEMORANDUM

Date: January 1, 2015

To: Mayor Bill de Blasio, Council Speaker Melissa Mark-Viverito, and Chair of the Committee on Sanitation and Solid Waste Management Antonio Reynoso

From: Kathryn Garcia

Re: Determination on the Recyclability of Expanded Polystyrene

Local Law No. 142 of 2013 (“LL 142”) mandates that the Commissioner of Sanitation (“DSNY”) make a one-time determination about the recyclability of expanded polystyrene (“EPS”), commonly known as foam, by January 1, 2015. Such determination is based on the criteria of environmental effectiveness, economic feasibility, and safety for employees of DSNY and Sims Municipal Recycling (“SMR”), the City’s recycling processor. This analysis is to be based on a recycling strategy that would incorporate EPS into the current NYC metal, glass, plastic & carton commingled collection program (“MGP program”) and that would not create a separate collection or sorting scheme.

To make this determination, DSNY and SMR conducted operational and financial analyses on the collection and sorting of EPS in the MGP program. Further, DSNY and SMR investigated the markets for post-consumer EPS and how much EPS would be recycled under the City’s MGP program. DSNY and SMR also conducted research, including making site visits to a number of facilities, to assess the current state of EPS recycling elsewhere in the United States and its feasibility for NYC.

Based on this analysis, described in more detail in the sections below, DSNY concluded that there are currently no established markets to purchase and recycle the EPS that would be collected in the MGP program, which is considered too “dirty” by current buyers. As such, a determination of recyclability fails on the basis of environmental effectiveness and economic feasibility, as defined in LL 142.

Proposal to subsidize a program

In response to the lack of viable markets for EPS, Dart Container Corporation (“Dart”), the largest manufacturer of EPS cups and containers in the world, approached DSNY and SMR with a proposal to establish a subsidized recycling program for NYC that would, for the first time, endeavor to build a large-scale facility outfitted with equipment to wash, dry, and otherwise

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prepare “dirty” EPS, which contains food waste and other contaminants, into a commodity that would be desirable for buyers and that would be recycled into new products. In its proposal, Dart offered to:

- Pay for the purchase and installation of equipment to sort polystyrene at the SMR materials recovery facility at the South Brooklyn Marine Terminal.
- Pay for Plastics Recycling, Inc. (“PRI”), a polystyrene recovery facility in Indianapolis, Indiana, to expand their operations to include equipment to clean and sort mixed, dirty polystyrene bales consisting of EPS and rigid polystyrene (“mixed polystyrene”)¹ from NYC.
- Purchase mixed polystyrene bales from SMR at a guaranteed price for a period of five years as feedstock for the PRI facility.
- Pay SMR for the disposal of mixed polystyrene bales during the program period, should the program be unsuccessful.

After careful consideration of Dart’s proposal, DSNY has concluded that the proposed program does not provide enough guarantees nor could it be implemented in a timeline to warrant a determination of recyclability as of January 1, 2015.

Although Dart has begun the process to pay for outfitting and expansion of the PRI facility with cleaning equipment, Dart forecasts the initial expansion will not be operational until late spring 2015. In addition, for certain components of Dart’s proposal to go into effect, SMR would have to finalize a contract with Dart for the purchase of the EPS collected. Additionally, SMR would need to complete the installation and testing of equipment to sort EPS and rigid polystyrene and bale mixed polystyrene as part of normal operations. SMR expects that this process would take up to two years to fully complete. As such, EPS would not be recycled until late 2016 or early 2017.

PRI currently recycles approximately 30,000 tons of clean, pre-consumer EPS annually, primarily sourced from the discards of the manufacturing process. Since the expanded PRI facility would be a first of its kind in scale and operation, its ability to recover dirty EPS at high rates while minimizing the amount being disposed of in landfills, and to clean the EPS sufficiently to attract buyers to recycle it into new products, is unproven. According to Dart, the PRI facility will initially capture and clean 25% of the EPS material brought to the facility by NYC. Additionally, in a test of its current optical sorters, SMR was able to sort less than half of the EPS in the MGP stream and as such SMR would initially only capture and send to PRI approximately 50% of the EPS collected as part of the MGP program. These low capture rates mean that initially the majority of EPS material collected by NYC would still be landfilled. While both capture rates may improve and PRI has said its facility is designed to be scalable,

¹ As described below, the sorting equipment at SMR does not distinguish between expanded polystyrene and rigid polystyrene products. The resulting bales include both expanded and rigid polystyrene, known as mixed polystyrene.

with an improved capture rate, there are no guarantees of what capture rate will ultimately be possible.

If after five years the program is found to be unviable, DSNY and SMR would still have to manage the costs and complications of having designated EPS as recyclable. Since the PRI facility would be the only outlet for EPS material from the MGP program, it would be highly risky for DSNY to assume that, even if the capture rate of polystyrene improves, the program proposed by Dart would result in the establishment of a market that could be sustained over time and that the mixed polystyrene bales generated by SMR would be in demand and would have value as a commodity after the subsidy period ends.

Determination

Based on the foregoing, and as described in further detail below, as of January 1, 2015, it is determined that EPS single service articles, as described in LL 142, cannot be recycled in the manner set forth in LL 142, and therefore are not designated as a recyclable material. As such, pursuant to LL 142, as of July 1, 2015, no food service establishment, mobile food commissary or store shall possess, sell, or offer for use single service articles that consist of EPS, unless otherwise exempt under LL 142, and no manufacturer or store shall sell or offer for sale polystyrene loose fill packaging in the City.

Background

Polystyrene is a plastic resin manufactured into consumer products in two main grades: expanded polystyrene (e.g. “foam” cups, containers, trays, etc.), and rigid polystyrene (e.g. certain brands of yogurt cups, clam shell packaging and CD cases etc.) In total, polystyrene comprises about 1.6% of the DSNY-managed curbside waste stream in roughly equal amounts expanded and rigid. DSNY collected approximately 58,000 tons of mixed polystyrene in FY14.²

Figure 1. Polystyrene in DSNY Collections*

	% in Waste	Total Tons
Expanded polystyrene (EPS)	0.79%	28,566
Rigid polystyrene**	0.83%	29,923
Total PS	1.63%	58,489
DSNY Collections FY14*	100.00%	3,596,000

* FY14 DSNY Collections includes the regular curbside and containerized collections of material from residences, schools, agencies, and litter baskets. It excludes street cleaning, aggregate fill, lot cleaning, and all other DSNY-managed waste. The % in waste comes from a curbside residential waste characterization study performed in FY13.

** Rigid polystyrene includes labeled rigid polystyrene items plus an assumption that 20% of unlabeled rigid plastics are made of polystyrene.

² Historically, both rigid and expanded polystyrene were excluded from the NYC MGP recycling program, because there has been no market for post-consumer polystyrene collected in a municipal commingled stream. In April 2013, DSNY started accepting rigid polystyrene when the MGP program was expanded to include all rigid plastics. Rigid polystyrene was included as part of NYC’s Recycle Everything campaign which sought to simplify recycling for NYC residents and maximize the collection of marketable material. To the general public, rigid polystyrene products are indistinguishable from other rigid plastics which do have economic value. EPS is easily identified by the general public, and therefore remained excluded from NYC’s program, reducing by half the contamination burden of polystyrene.

Analysis of Recyclability

DSNY and SMR analyzed the recyclability of EPS. This analysis included developing capital cost estimates for machinery, assessing industry information and impact on operations, and consulting with other municipalities.

To understand existing EPS recycling efforts elsewhere in the United States, SMR and DSNY conducted joint site visits to four facilities in southern California that sort, recycle, and reclaim EPS. DSNY and SMR additionally consulted with the city of Los Angeles, which accepts EPS in its recycling program. DSNY and SMR both concluded that while small, locally successful efforts to recycle EPS exist in southern California, they are very small or subsidized programs, and that the facilities do not operate at a scale large enough to be considered viable outlets for NYC.

In making the determination that EPS is not recyclable, DSNY consulted with the following stakeholders:

- SMR, NYC's contracted vendor for metal, glass, and plastic recycling;
- Dart, the world's largest manufacturer of EPS consumer products;
- PRI, a recycler of polystyrene in Indianapolis, IN;
- The City of Los Angeles Sanitation Department, Los Angeles, California (large municipality that accepts EPS into its commingled curbside recycling program);
- Burrtec, a materials recovery facility (MRF) in Riverside, California;
- Titus, a MRF in East Los Angeles, California; and
- NAPCO, a polystyrene frame and molding manufacturer in Pomona, California.

SMR additionally consulted with eight potential buyers of baled polystyrene sourced from NYC's municipal MGP collection program.

DSNY also met with the following interested parties:

- The New York League of Conservation Voters;
- The Natural Resources Defense Council;
- Covered establishments including Dunkin' Donuts, McDonald's, and Jamba Juice;
- The New York City Departments of Education, Health, and Small Business Services;
- Selected Business Improvement Districts; and
- The New York State Restaurant Association.

Safety for Employees

As defined in LL 142, "Safe for employees" means that, among other factors, the collection and sorting of any source separated material does not pose a greater risk to the health and safety of persons involved in such collection and sorting than the risk associated with the collection and sorting of any other source separated recyclable material in the metal, glass and plastic recycling stream.

- DSNY determined that collection of EPS in the MGP program would not create additional hazards for Sanitation Workers.
- SMR determined that the process to sort EPS at the South Brooklyn Marine Terminal would be safe for its employees.

Environmental Effectiveness

As defined in LL 142, "Environmentally effective" means not having negative environmental consequences including, but not limited to, having the capability to be recycled into new and marketable products without a significant amount of material accepted for recycling being delivered to landfills or incinerators.

- As of January 2015, EPS collected in the NYC commingled MGP program would be disposed of in landfills or incinerators.
- DSNY and SMR were unable to find current buyers for post-consumer EPS that had been sorted and baled at SMR's South Brooklyn Marine Terminal Facility. In a test of its current optical sorters, SMR was able to sort less than half of the EPS in the MGP stream.

If EPS were designated as recyclable, the EPS collected would be dirty, meaning that it would contain food residue and other contaminants. This is in contrast to the limited number of clean EPS recycling programs and businesses that currently exist in the United States. Clean EPS refers to material that is collected in a separate drop off program in which the EPS remains segregated from other materials, and free of contaminants, such as food residue. Clean EPS primarily consists of polystyrene used in packaging products or clean discards from the EPS manufacturing process. There are buyers for clean EPS. On the other hand, it is impossible to keep EPS clean in a commingled program like the one operated by DSNY. Rather, EPS collected by the MGP program would be soiled or "dirty" due to being in a commingled load with multiple materials, food residue and other contaminants and/or from being utilized by consumers, creating cost and quality concerns with any attempt to recover the material.

SMR conducted tests of its optical sorting machines and baling equipment to separate EPS and package it into bales, the standard packaging method to transport and sell recycled material. SMR temporarily repurposed one of its existing sorting lines to capture EPS present in the MGP stream due to residents' error. The optical sorters are not able to distinguish between EPS and rigid polystyrene, resulting in the production of a mixed polystyrene bale. While the optical sorters separated some of the polystyrene from the other plastics, the recovery rates for polystyrene in the tests performed at the SMR facility were between 39% and 45% (in roughly equal percentages EPS and rigid polystyrene), meaning less than half of the polystyrene items that passed under the optical sorter were successfully separated from the rest of the material. SMR anticipates that it could improve the recovery rate to as high as 75% over time as it fine-tunes the equipment and operations. Until those improvements could be made, over half of the EPS material sent to the SMR facility would be landfilled.

Dart has stated that the PRI facility is initially being built with the ability to process 25% of the dirty mixed polystyrene bales collected from NYC's MGP program, which is expected to

improve over time. Accordingly, at least initially, less than half of the EPS SMR would send to PRI would be recycled and recovered. When coupled with an initial capture rate of less than 50% at the SMR facility, a significant majority of the NYC EPS would be landfilled by either SMR or by PRI.

SMR conducted outreach to potential buyers and found no current market for mixed polystyrene bales. SMR spoke to purchasing agents at eight companies, sent photos of SMR sorted mixed polystyrene, discussed the quality of the baled material, and subsequently determined that none of these companies were interested in or capable of purchasing and/or processing post-consumer EPS of the quality that SMR would be able to produce. In general, these companies considered the material too “dirty” based on contamination from food waste, labels, or other non-polystyrene materials that SMR would not be able to remove.

In addition, the presence of measurable amounts of EPS in other plastic commodity bales, such as Polyethylene Terephthalate or High Density Polyethylene, is considered contamination and lowers the bale density, both of which can reduce the value and desirability of bales of otherwise marketable plastic material. Any EPS that, in error, ends up in plastic bales marketed by SMR is ultimately disposed of by the buyer of the bale.

DSNY and SMR spoke to the Los Angeles Bureau of Sanitation, which accepts EPS in its curbside recycling program, to determine the recycling outlets for the material and whether any of them would be viable for NYC. Despite the inclusion of EPS in LA’s recycling program, LA does not actually require that the EPS material collected be recycled. Through its five vendors, LA manages 200,000 tons annually of single stream recyclables. Five percent of the total tonnage is plastics, and LA estimates only 70 tons of EPS and/or polystyrene is recovered annually.

DSNY and SMR visited the Dart Container Facility in Corona, CA to observe a small scale operation that washes, dries and condenses food-soiled EPS to understand the viability of getting “dirty” EPS clean enough to be recycled. This facility cleans approximately half a ton of EPS trays and cups per day collected in special programs with area schools and institutions (approximately 150 tons per year). While this micro-industry appears to clean and recycle dirty product, the resulting material is still very low in value – it is provided at no cost to NAPCO, a picture frame and molding manufacturer in Pomona, CA. Even if there were buyers for the clean material, the facility is much too small to process the anticipated 11,400 tons per year of EPS in a NYC Program.

At the Burrtec recycling facility in Riverside, CA, EPS is sorted manually, with a focus on clean and white product to command the highest price. The facility has a machine that condenses the hand-sorted EPS into blocks, and produces two truckloads of saleable product annually or approximately 14 tons out of an annual throughput of approximately 100,000 tons commingled material.

The polystyrene recycling observed by SMR and DSNY at recycling facilities in southern California is limited in scale, subsidized, and the market is primarily for the pure white hand-sorted EPS shipping material with a very limited amount of clean food service items, such as egg cartons, unless the polystyrene has gone through a cleaning process.

As a majority of the EPS collected by NYC's MGP program would initially be landfilled, and the ability to clean and recycle dirty post-consumer EPS on a larger scale is as yet unproven, designating EPS as recyclable is not environmentally effective, as defined under LL 142.

Economic Feasibility

As defined in LL 142, "Economically feasible" means cost effective based on consideration of factors including, but not limited to, direct and avoided costs such as whether the material is capable of being collected by the Department in the same truck as source separated metal, glass and plastic recyclable material, and shall include consideration of markets for recycled material.

- DSNY estimates that the recycling of EPS would not add additional recycling or refuse collection truck mileage due to the relatively low weight of EPS in the system, and the current excess capacity per truck shift.
- There is a lack of buyers and markets that would purchase EPS from the MGP program.

As discussed in the Environmental Effectiveness section above, there are currently no buyers for the dirty EPS captured in the MGP program, and as such, if EPS were designated as recyclable, it would continue to be landfilled at this time. Given that the material is ultimately destined for disposal in a landfill, there is little justification for DSNY to ask the public to sort the material for recycling or to have SMR use resources to sort and bale it.

To understand what the costs would be to handle the EPS that would be collected if it were included in the MGP program, DSNY asked SMR to estimate the capital investment and ongoing operational costs.

Designating EPS as a recyclable material would require the purchase and installation of new sort lines at both the South Brooklyn and Jersey City SMR facilities. (A certain percentage of NYC's MGP is taken to SMR's Jersey City facility). SMR's vendors and installers estimate the capital cost at \$2.46M. In addition, there would be additional monthly baseline operating costs regardless of tonnage recovered of at least \$25K to \$35K that would increase incrementally with tonnage recovered. As part of this cost, two additional staff per shift (four total) would be required to support additional sorting lines at the facilities if to the facilities must sort and bale polystyrene.

DSNY estimates that the recycling of EPS would not add additional recycling or refuse collection truck mileage due to the relatively low weight of EPS in the system, and the current excess capacity per truck shift. EPS currently accounts for 0.8% of the City's curbside waste. These 28,500 tons cost on average \$3.14M to dispose of in landfills and at waste-to-energy

facilities. Assuming that EPS was captured in the MGP program at the rate of 40%, the cost to the City to process it for recycling would be \$857,000. The residual EPS remaining in the waste stream would cost about \$1.89M for disposal. Although there may be an initial differential tip fee savings to the City from recycling EPS of roughly \$400K, given the lack of markets for EPS, any cost savings to NYC for collecting EPS in the MGP program may well be temporary and be accompanied by other future costs.

When determining whether to add new items to a recycling program, it is standard practice to analyze demand, price, and quantity.

- *Demand:* There must be buyers for the commodity, and the demand must be shown to be relatively consistent over time as opposed to intermittent “spot markets.”
- *Price:* The price offered for a commodity must be worth the expense of sorting the material and projected to cover the debt service of the capital investment.
- *Quantity:* Sufficient quantity from the residential waste stream is needed to support the effort.

Buyers of recycled EPS require a clean, homogeneous product, such as pre-consumer material sourced from the discards of the manufacturing process. It is impossible to keep EPS clean in a commingled program like the one operated by DSNY. Rather, EPS collected by the MGP program would be soiled or “dirty” due to being in a commingled load with multiple materials, food residue and other contaminants and/or from being utilized by consumers, creating cost and quality concerns with any attempt to recover the material. As mentioned above, SMR outreach to potential buyers confirmed that there is no current demand for EPS from NYC’s MGP program.

As discussed above, while equipment and technologies may exist to sort EPS from a commingled load of recyclables, such equipment has significant up front capital and ongoing operational costs. Even if EPS can be sorted, it then needs to be washed and cleaned before anyone will want to buy it, further adding to the costs. (SMR confirmed that its facilities are not built to accommodate a cleaning system for EPS.) The higher the cost to sort and prepare material, the higher the commodity sale price would need to be to offset the costs. The quantity of EPS in a NYC recycling program, combined with an undetermined value for the material, once sorted and cleaned, does not justify the ongoing investment needed to accommodate EPS in the MGP program over time.

Even if Dart implements a subsidized program as it promises, the City cannot assume, given the untested nature of the process, that there will be a buyer(s) after five years for the mixed polystyrene bales. When NYC designates a material as recyclable, it is with a long-term timeline in mind. If, after the five year subsidy, there were still no market for EPS, DSNY and SMR would have to manage the costs and complications of having designated EPS as recyclable.

It has not been proven that recycling dirty foam can be done on a large scale, and there is no demonstrated market for this material.

Conclusion

Based on the foregoing, EPS single service articles are determined not to be recyclable as part of NYC's municipal recycling program. Currently, there are no economic markets in existence for the EPS collected by NYC's MGP program. As such, EPS recycling cannot be shown to be economically feasible. Additionally, a majority of the EPS collected by NYC's MGP program would initially be landfilled, which is not environmentally effective, as defined under LL 142. Lastly, the subsidized program proposed by Dart cannot be implemented by January 2015 and there are no guarantees of the ultimate economic feasibility or environmental effectiveness of the proposed Dart program sufficient to warrant a determination that EPS is recyclable as of this date.

Therefore, as of January 1, 2015, it is determined that EPS single service articles cannot be recycled in the manner set forth in LL 142. As of July 1, 2015, no food service establishment, mobile food commissary or store shall possess, sell, or offer for use single service articles that consist of EPS unless otherwise exempt under LL 142, and no manufacturer or store shall sell or offer for sale polystyrene loose fill packaging in the City.