



## **Comments on Draft Report to VT ANR**

### *Comparison of System Costs and Materials Recovery Rates: Implementation of Universal Single Stream Recycling With and Without Beverage Container Deposits*

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Thank you for considering NAPCOR's comments on the draft report issued on March 4, 2013. The comments that follow are intended to build on those we submitted on March 14; they provide greater detail on issues raised in those comments and at the March 14 technical meeting, and additional analysis based on a more in-depth review of the report.

As we mentioned in our March 14 comments, NAPCOR is deeply committed to maximizing the recycling of postconsumer PET. We support the efforts of states like Vermont to analyze various collection and processing strategies to determine the most effective approach, based on both cost and performance. These comments are intended to ensure that the final report accurately reflects the costs and benefits of the various scenarios being evaluated.

The comments provided below address the following:

- Corrections to calculation errors
- Consistent data, based on NAPCOR research and field work, applied where there were inconsistencies among the data used in different tables
- A recalculation of deposit system costs using different assumptions
- A correction of the MRF revenue assumptions in the report
- A calculation of projected collection costs of a universal single stream system

The data and analysis we present below have a significant impact on the overall cost estimates for the report's three scenarios. NAPCOR understands that the state is under significant fiscal constraints, and that obtaining good data for some of the cost elements of this report, particularly the cost of expanding single stream and developing commercial and away-from-home collection, could be time-consuming and costly. If the state cannot reconcile the data errors and inconsistencies we describe below and in our prior comments, and cannot provide a realistic estimate of the costs of achieving significant increases in materials diversion without a deposit system, we urge Vermont ANR to withhold the release of a final report.

### *1. Calculation Errors*

There are several errors in the calculations in Table 9 of the draft report which result in the material revenue being understated, collection costs under the expanded bottle bill being inflated and handling fees under the expanded bottle bill being understated. Correcting these errors reduces the cost of the existing bottle bill system by nearly \$1.3 million and of the expanded bottle bill by \$3 million. (See Table A)

### *2. Data Inconsistencies*

In Tables 1, 2 and 4 of the draft report, it correctly differentiates the number of PET bottles per ton (units/ton) for soft drinks, beer, liquor and expanded bottle bill materials. Unfortunately, the units/ton by category are not consistently applied (e.g., soft drink units/ton are 29,914 in Table 1 and 29,151 in Table 2). NAPCOR has tracked container weights for the last five years; from data gathered in our annual bale sort analyses, we've calculated the number of containers per pound for each PET packaging category. In Tables B and C below, we used the data from a 2012 bale sort, which captures the current extent of PET light-weighting. The result of this standardization is a slight increase in the number of PET containers in each table and an increase in the estimated PET recoverable under the expanded bottle bill in Table 4 of the draft report.

### *3. Deposit System Costs*

As mentioned in the technical meeting, NAPCOR does not view the costs to consumers and to third-party redeemers in Table 9 of the draft report as direct system costs. If a consumer chooses to drive out of their way to redeem containers, it is a matter of personal choice and convenience, as is the decision to forfeit the deposit value by throwing containers away. While it might be helpful to articulate these costs, it would be more appropriate to represent them separately and as indirect or marginal costs.

In the report text, and in the discussion at the technical meeting, it was noted that the 90 percent redemption rate reflected in Table 9 may not be accurate. The report notes that in states that require distributors to report both sales and redemption, redemption rates are approximately 70 percent. Given that the number of containers redeemed is a firm number, it is likely that somehow the beverage sales are understated. NAPCOR increased the estimated beverage sales to reflect the more likely return rate of 75 percent.

Table D is a recalculation of the report's Table 9 that corrects the calculation errors; it is based on consistent unit per ton counts, includes only direct costs, and reflects a 75 percent return rate. It

shows direct costs of just over \$5 million for the bottle bill system, and \$4.6 million for the expanded bottle bill.

Other stakeholders, including the providers of distributor collection, have noted that the distributor collection costs and RVM costs listed in Table 9 are overstated. If those costs were adjusted to be more realistic, costs for the existing bottle bill would be reduced even further, and the expanded bottle bill would be a net-positive.

#### *4. MRF Processing Costs and Revenues*

Table 14 of the draft report estimates the revenue potential of PET bottles collected through curbside programs at \$.30 per pound, significantly above both the historical average market value and the current price paid to Vermont MRFs. NAPCOR has tracked PET curbside bale pricing for the last 15 years. The average per-pound price for curbside bales in the last five years was \$.14; the average for the full 15-year period was \$.15. The market outlet for Vermont MRFs reports a slight premium paid, given the high-quality materials being generated, and suggests \$.17 per pound as a reasonable estimate. Table E presents the correct data and shows a reduction of \$338,000 in net cost for the existing bottle bill, and an \$836,000 reduction in costs for the expanded bottle bill.

Table 14 of the draft report also estimates a \$0 revenue for glass, which appears to be optimistic. At least one of the outlets for mixed glass from Vermont MRFs reports charging for freight, which amounts to a cost of \$23 per ton.

#### *5. Recycling Collection Costs*

The report appears to underestimate the cost of implementing a statewide single stream collection system. Its authors have noted that they did not attempt a “ground up” analysis of the costs of implementing single stream, but instead assumed that current costs (estimated based on current price paid for subscription service) would increase slightly. As we noted in our earlier comments, this approach does not capture the true cost of expanding single stream to service a large number of commercial entities, nor does it capture the true cost of additional residential service.

NAPCOR commissioned an independent analysis to provide that “ground up” perspective on single stream costs. The results of that analysis, provided in Table F, show a single stream system cost \$75 per ton higher than that in the report. While there are several differences in the outcomes of the two analyses, the two most significant are the costs of commercial recycling and the proposed capture rate in drop-off collection programs. In addition, the NAPCOR analysis uses a distance-

based cost method that allows curbside collection to be assigned to households based on the travel time to a MRF. Using this analytical technique, more households receive curbside collection (171,000) and fewer utilize drop-off collection.

NAPCOR's analysis of commercial single stream collection costs is based on data used by a major waste management company in responding to two recent public bids, which included a combination of curb cart services and dumpster services dependent on the size of business. They represent the true service costs, including the cost of dumpsters, carts or other capital investments required, and the cost of servicing small commercial entities and away-from-home sources including public spaces.

Another significant difference is that NAPCOR's universal single stream analysis relies on the assumption that drop-off sites would achieve a collection rate of 350 pounds per household—a substantial increase over the 255 pounds per household in the current system, but not quite as high as the 460 pounds per household the DSM report projects. While universal access to recycling and pay-as-you-throw will have a significant impact on drop-off diversion, an increase of 80 percent appears overly optimistic. Even the 35 percent increase we project is ambitious, as PAYT systems are documented to increase recycling by an average of 25 percent.

## *6. Conclusions*

Once the inaccuracies, miscalculations and inconsistencies in the draft report are corrected, and reasonable assumptions are applied, the outcome of the analysis is significantly different. NAPCOR's analysis, summarized in Table G, shows that the current system is the most cost-effective option. The combination of statewide single stream and an expanded bottle bill is essentially equivalent with universal single stream alone in terms of costs, and outperforms single stream alone in terms of diversion.

Applying NAPCOR's analysis increases the disparity between the costs of universal single stream collection and those of container deposit systems.

NAPCOR understands that the state is facing fiscal constraints, and is undertaking a larger study of the cost of implementing various elements of Vermont's very ambitious Act 148. If resources are not available to address the many concerns with this report, NAPCOR urges the state to withhold the final report and focus its resources on developing a transparent and thorough analysis of the state's options in the next phase of the study.

**Table A. Analysis of Costs Associated with the Bottle Bill, 2011; with Calculation Errors Corrected<sup>1</sup>**

Parties/Costs/Revenues	Bottle Bill			EBB	
	Cost/Cont	# Containers	Total Cost	# Containers	Total Cost
<b>State Administrative Costs</b>			\$(21,500)		\$(250,000)
<b>Distributors</b>					
Deposits Collected	\$0.050	270,382,906	\$13,519,145	383,230,704	\$19,161,535
Deposits Redeemed	\$(0.050)	241,948,782	\$(12,097,439)	324,966,302	\$(16,248,315)
Deposits Collected, Wine	\$0.150		\$0	9,846,154	\$1,476,923
Deposits Redeemed, Wine	\$(0.150)		\$0	7,384,616	\$(1,107,692)
Handling Fees Paid Out			\$0		
Commingled	\$(0.035)	183,881,075	\$(6,435,838)	217,628,096	\$(7,616,983)
Sorted	\$(0.040)	58,067,708	\$(2,322,708)	117,184,360	\$(4,687,374)
Collection Costs (third-party and own)	\$(0.019)	241,948,782	\$(4,597,027)	334,812,456	\$(6,361,437)
Materials Revenue received					
Aluminum	\$0.027	146,197,885	\$3,947,343	153,765,729	\$4,151,675
Plastics	\$0.022	35,946,005	\$790,812	107,765,988	\$2,370,852
Glass	\$0.006	59,804,892	\$358,829	70,540,336	\$423,242
<b>Sub-Total, Distributors</b>			<b>\$(6,836,882)</b>		<b>\$(8,437,575)</b>
<b>Vermont Liquor Control</b>					
Deposits Collected	\$0.150	3,745,035	\$561,755	3,745,035	\$561,755
Deposits Paid Out	\$(0.150)	2,860,458	\$(429,069)	2,860,458	\$(429,069)
Collection Cost	\$(0.078)	2,860,458	\$(223,116)	2,860,458	\$(223,116)
Handling Fees Paid Out	\$(0.035)	2,860,458	\$(100,116)	2,860,458	\$(100,116)
Materials Revenue Received	\$0	-	\$0		
<b>Sub-Total, VLC</b>			<b>\$(190,545)</b>		<b>\$(190,545)</b>
<b>Retailers/Redemption Centers</b>					
RVM Costs	\$(0.050)	24,194,878	\$(1,209,744)	48,744,945	\$(2,437,247)
Manual Costs	\$(0.038)	217,753,905	\$(8,239,953)	283,605,972	\$(10,731,840)
Handling Fees Received	\$0.036	241,948,783	\$8,758,546	332,350,917	\$12,304,358
<b>Sub-Total, Retailers/Redemption</b>			<b>\$(691,151)</b>		<b>\$(864,729)</b>
<b>Consumers</b>					
Deposits Paid	\$(0.050)	270,382,906	\$(13,519,145)	383,230,704	\$(19,161,535)
Deposits Received	\$0.050	205,656,466	\$10,282,823	276,221,357	\$13,811,068
Liquor Deposits Paid	\$(0.150)	3,745,035	\$(561,755)	13,591,189	\$(2,038,678)
Liquor Deposits Received	\$0.150	2,860,458	\$429,069	10,245,074	\$1,536,761
Special Trips to Redeem	\$(0.015)	208,516,924	\$(3,127,754)	286,466,430	\$(4,296,996)
<b>Sub-Total, Consumers</b>			<b>\$(6,496,762)</b>		<b>\$(10,149,381)</b>
<b>Third Party Redeemer</b>					
Deposits Paid	\$(0.050)	-	\$0	-	
Deposits Received	\$0.050	36,292,317	\$1,814,616	48,744,945	\$2,437,247
<b>Sub-Total, Third Party Redeemers</b>			<b>\$1,814,616</b>		<b>\$2,437,247</b>
<b>Total</b>			<b>\$(12,422,225)</b>		<b>\$(17,454,983)</b>
<b>Tons Managed/Cost Per Ton</b>		18,096	\$(686)	24,450	\$(714)
<b>Difference from Draft Report</b>			<b>\$(1,252,885)</b>		<b>\$(2,984,922)</b>

<sup>1</sup>Corrected errors are highlighted

**Table B. Recalculated PET Tonnages from Tables 1 and 2**

<b>Adapted from Table 1. Sales of Vermont Deposit Beverage Containers, 2011; Recalculated</b>				
	<b># Containers<sup>1</sup></b>	<b>Tons in Original Report</b>	<b>Container/Ton<sup>2</sup></b>	<b>Recalculated Tons</b>
<b>Soft Drink</b>	47,846,488	1,560	27,800	1,721
<b>Beer</b>	81,519	2	28,000	3
<b>Liquor</b>	381,395	88	14,000	27
<b>Total PET Sales</b>	<b>48,309,401</b>	<b>1,650</b>		<b>1,751</b>
<b>Adapted from Table 2. Returns of Vermont Deposit Beverage Containers, 2011; Recalculated</b>				
<b>Soft Drink</b>	35,884,866	1,231	27,800	1,291
<b>Beer</b>	61,139	2	28,000	2
<b>Liquor</b>	286,046	18	14,000	20
<b>Total PET Redemptions</b>	<b>36,232,051</b>	<b>1,251</b>		<b>1,313</b>
<p><sup>1</sup>Number of containers sold was recalculated based on a 75% redemption rate. See Section 3 for further discussion.</p> <p><sup>2</sup>Based on container weights tracked by NAPCOR.</p>				

**Table C. Recalculated PET Tonnages from Table 4**

<b>Adapted from Table 4. Estimated Increase in Material Returns under an Expanded Bottle Bill, Recalculated</b>						
	<b>BB (ctrs)</b>	<b>EBB (ctrs)<sup>1</sup></b>	<b>BB (tons)<sup>2</sup></b>	<b>EBB Container/Ton<sup>3</sup></b>	<b>EBB (tons)</b>	<b>Total Tons</b>
<b>PET</b>	48,309,401	112,411,132	1,751	32,500	3,459	<b>5,210</b>
<p><sup>1</sup>PET container increase for EBB adjusted based on NAPCOR estimates of consumption in VT.</p> <p><sup>2</sup>Based on a 75% redemption rate and container weights tracked by NAPCOR.</p> <p><sup>3</sup>Using an average container per ton based on NAPCOR data for EBB containers (juice, water and other beverages, such as sports drinks).</p>						

**Table D. Analysis of Costs Associated with the Bottle Bill, Recalculated from Table 9**

Parties/Costs/Revenues	Bottle Bill			EBB	
	Cost/Cont	# Containers	Total Cost	# Containers	Total Cost
<b>State Administrative Costs</b>			\$(21,500)		\$(250,000)
<b>Distributors</b>					
Deposits Collected <sup>1</sup>	\$0.050	322,598,376	\$16,129,919	459,533,176	\$22,976,659
Deposits Redeemed	\$(0.050)	241,948,782	\$(12,097,439)	344,649,882	\$(17,232,494)
Deposits Collected, Wine	\$0.150		\$0	9,846,154	\$1,476,923
Deposits Redeemed, Wine	\$(0.150)		\$0	7,384,616	\$(1,107,692)
Handling Fees Paid Out			\$0		
Commingled <sup>2</sup>	\$(0.035)	183,881,075	\$(6,435,838)	224,022,423	\$(7,840,785)
Sorted	\$(0.040)	58,067,708	\$(2,322,708)	120,627,459	\$(4,825,098)
Collection Costs (third-party and own)	\$(0.019)	241,948,782	\$(4,597,027)	344,649,882	\$(6,548,348)
<b>Materials Revenue received<sup>3</sup></b>					
Aluminum	\$0.027	146,197,885	\$3,947,343	203,792,938	\$5,502,409
Plastics	\$0.022	35,946,005	\$790,812	168,100,061	\$3,698,201
Glass	\$0.006	59,804,892	\$358,829	97,486,330	\$584,918
<b>Sub-Total, Distributors</b>			<b>\$(4,226,109)</b>		<b>\$(3,315,307)</b>
<b>Vermont Liquor Control</b>					
Deposits Collected <sup>1</sup>	\$0.150	3,813,944	\$572,092	3,813,944	\$572,092
Deposits Paid Out	\$(0.150)	2,860,458	\$(429,069)	2,860,458	\$(429,069)
Collection Cost	\$(0.078)	2,860,458	\$(223,116)	2,860,458	\$(223,116)
Handling Fees Paid Out	\$(0.035)	2,860,458	\$(100,116)	2,860,458	\$(100,116)
Materials Revenue Received	\$0	-	\$0		
<b>Sub-Total, VLC</b>			<b>\$(180,209)</b>		<b>\$(180,209)</b>
<b>Retailers/Redemption Centers</b>					
RVM Costs	\$(0.050)	24,194,878	\$(1,209,744)	48,744,945	\$(2,437,247)
Manual Costs	\$(0.038)	217,753,905	\$(8,239,953)	283,605,972	\$(10,731,840)
Handling Fees Received	\$0.036	241,948,783	\$8,758,546	332,350,917	\$12,304,358
<b>Sub-Total Retailers/Redemption</b>			<b>\$(691,151)</b>		<b>\$(864,729)</b>
<b>Total<sup>4</sup></b>			<b>\$(5,118,969)</b>		<b>\$(4,610,245)</b>
<b>Tons Managed/Cost Per Ton</b>		18,158	\$(282)	27,585	\$(167)

<sup>1</sup>Deposits collected were recalculated to reflect a 75% redemption rate from the known deposits redeemed.

<sup>2</sup>The commingled vs. sorted ratio did not change from draft report. The total of the two now reflects the recalculated redemption total.

<sup>3</sup>Container totals used to determine material revenues for EBB were recalculated based on a 75% redemption rate and to reflect more accurate PET bottle weights.

<sup>4</sup>Indirect costs (to consumers and third-party redeemers) were removed.

**Table E: Corrected MRF Costs & Revenues**

Material	Tons processed		Processing Cost(\$)		Revenue (\$)		Net Cost (\$)	
	BB <sup>1</sup>	EBB <sup>2</sup>	BB	EBB	BB	EBB	BB	EBB
<b>Aluminum</b>	2,207	2,390	\$(154,490)	\$(167,279)	\$2,178,000	\$2,400,000	\$2,023,510	\$2,232,721
<b>Glass</b>	14,638	21,288	\$(1,024,660)	\$(1,490,172)	\$0	\$0	\$(1,024,660)	\$(1,490,172)
<b>PET<sup>3</sup></b>	1,313	3,908	\$(91,941)	\$(273,528)	\$446,569	\$1,328,564	\$354,628	\$1,055,036
	<b>18,158</b>	<b>27,585</b>	<b>\$(1,271,091)</b>	<b>\$(1,930,979)</b>	<b>\$2,624,569</b>	<b>\$3,728,564</b>	<b>\$1,353,478</b>	<b>\$1,797,585</b>

<sup>1</sup>Totals reflect recalculated tonnages based on NAPCOR-estimated PET bottle weights and maintains consistent data from Table 2.

<sup>2</sup>Totals reflect a 75% redemption rate and recalculated sales tonnages based on more accurate PET bottle weights.

<sup>3</sup>PET revenue recalculated to reflect a more accurate revenue of \$0.17 / pound.

**Table F. Estimated Single Stream Recycling Collection Costs<sup>1</sup>**

<b>Collection Type</b>	
Curbside Tons	43,109.3
Drop-off Tons	19,006.2
Commercial Tons	64,679.2
<b>Total Tons</b>	<b>126,794.7</b>
Curbside Cost	\$16,394,468
Drop-off Cost	\$2,525,905
Commercial Cost	\$16,959,859
<b>Total Cost</b>	<b>\$35,880,232</b>
Curbside Cost/ton	\$380.30
Drop-off Cost/ton	\$132.90
Commercial Cost/ton	\$262.22
<b>Overall Cost/ton</b>	<b>\$282.98</b>
<sup>1</sup> Based on NAPCOR-commissioned independent analysis.	

**Table G. Cost Comparison of the Systems Analyzed, Recalculated**

Costs and Materials Recovery	Existing System	Single Stream Only	Single Stream and Bottle Bill	Single Stream and Expanded Bottle Bill
Costs	\$	\$	\$	\$
Bottle Bill <sup>1</sup>	\$5,118,969		\$5,118,969	
Expanded Bottle Bill <sup>1</sup>				\$4,610,245
Curbside and Drop Off	\$14,266,000	\$27,238,950	\$25,154,550	\$24,226,650
Litter Collection		\$1,526,995	\$441,235	
Avoided Disposal Savings	\$(8,382,599)	\$(10,509,299)	\$(11,148,299)	\$(11,352,599)
Lost MRF Revenue			\$1,570,070	\$2,251,694
<b>Total Cost</b>	\$1,002,370	\$18,256,646	\$21,136,525	\$19,735,990
<b>Materials Recovery After Losses<sup>2</sup></b>				
Bottle Bill Material				
Aluminum	2,381	2,316	2,935	2,935
PET	1,935	1,581	2,409	3,925
Glass	24,309	20,333	25,834	28,157
Other Containers	3,900	4,444	4,701	4,701
Fiber	60,588	88,288	88,288	88,288
<b>Total Tons Recovered</b>	93,113	116,963	124,166	128,006
<b>Cost per Ton</b>	\$118	\$156	\$170	\$154

<sup>1</sup>Bottle Bill and Expanded Bottle Bill costs reflect the totals recalculated from Draft Report Table 9 (see Table D).

<sup>2</sup>Tonnages more accurately reflect NAPCOR-estimated PET bottle weights, are consistent with previous tables in draft report and are calculated with a 75% redemption rate.