Processing Fee Cost Survey

Final Summary Report

Report Number 10 of 11

Division of Recycling
Market Research Branch

NewPoint Group®
Management Consultants

February 15, 2006

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NewPoint Group®
Management Consultants

February 15, 2006

Mr. Chuck Seidler
California Department of Conservation
Division of Recycling
Manager, Market Research Branch
801 K Street, 17th Floor
Sacramento, California 95814

Regarding: **Final Summary Report, Processing Fee Cost Survey**

Dear Mr. Seidler:

On behalf of all the team members who worked on this Processing Fee Cost Survey, NewPoint Group is pleased to submit this Final Summary Report, Processing Fee Cost Survey. The cost survey was performed under contract by NewPoint Group for the California Department of Conservation.

The processing fee cost survey was a major primary–data, economic cost survey of California certified recycling centers. This survey was used to estimate California statewide weighted–average, 2004 certified recycler costs per ton, for ten beverage container types. Recycler center costs were surveyed in 2005, using recycler center calendar year 2004 financial statements. Recycler center costs measured by this survey were used for the processing fee calculation, effective January 1, 2006.

This Final Summary Report describes the tasks conducted by NewPoint Group in completing this processing fee cost survey. The Final Summary Report includes a description of the cost survey methodologies, cost per ton calculations and results, and processing fee and processing payment calculations.

The NewPoint Group team appreciates the opportunity to conduct this major economic cost survey for the Department of Conservation. Formulating processing fees is a large cost–accounting challenge, rivaling the technical requirements of state–of–the–art, activity–based costing techniques used by private industry.

A project of this magnitude requires a high degree of communication and collaboration by all involved. We wish to thank the Division of Recycling management, and staff in the Market Research Branch, for their tremendous support and cooperation throughout this entire project.

If you have any questions concerning this cost survey, please feel free to contact either myself at (916) 442-0189, or Ms. Wendy Pratt at (916) 442-9227.

Very truly yours,

NewPoint Group®

James A. Gibson, Ph.D.
Director

cc: Mr. Chris Goetzke
Mr. Graham Johnson

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Executive Summary

The processing fee cost survey was performed under contract by NewPoint Group Management Consultants, for the California Department of Conservation (Department). This *Final Summary Report* provides estimates of the cost to recycle aluminum, bi-metal, glass, and plastic (for seven different resin types) beverage containers. This report also summarizes the tasks NewPoint Group, and their subcontractors, conducted in order to obtain the final, statewide, weighted-average, recycler costs per ton, and a discussion of processing payments and processing fees.

A. Cost Survey Background

This processing fee cost survey was used to estimate California statewide, weighted-average, 2004 certified recycler costs per ton, for ten beverage container material types. Recycler center costs were surveyed in 2005 (April through September), using recycler center calendar year 2004 financial statements. Recycler center costs measured by this survey were used for the processing fee calculation, effective January 1, 2006.

This processing fee cost survey was the largest cost survey (189 unique sites for 2004 versus 181 unique sites in 2002) undertaken by the Department of Conservation to-date. The NewPoint Group team completed 189 recycler site visits to obtain the cost survey results. This processing fee cost survey is also the most detailed and complex (one stratified random sample, one simple random sample, and one census survey) of any prior Department cost survey, in terms of quantitative information obtained. Finally, this cost survey is the most accurate cost survey yet undertaken, generally exceeding the already high level of accuracy obtained in 2002.

B. Cost Survey Results

The statewide recycler costs per ton for the ten material types in the beverage container recycling program are presented in **Table ES-1**, on the following page. The costs per ton are shown by order of magnitude, from lowest to highest. The 2004 costs per ton are compared to 2002 costs per ton, the most recent cost survey in which recycler costs were measured by the Department of Conservation.

As compared to 2002 costs per ton, aluminum increased 11 percent, and costs per ton for glass and PET #1 each increased by 3 percent. The aluminum trend line is consistent with what we have seen historically, with aluminum costs per ton steadily rising. PET #1 costs per ton have historically been decreasing with increasing volumes, as market share shifts from aluminum to PET #1. However, the higher PET #1 volumes in 2004 were not enough to overcome generally higher recycling costs, resulting in a 3 percent increase in PET #1 costs per ton over 2002. The glass recycling cost per ton also increased slightly, however it continues to be relatively stable, as it has been over the last several years, at about $80 per ton.

Costs per ton for the other seven materials were calculated for the first time in 2002, thus the results below represent the first comparison of costs per ton between sequential cost surveys. Similar to PET #1, costs per ton for HDPE #2 increased slightly from 2002, at 4 percent, an increase that occurred even in light of significant volume increases in HDPE #2 recycling. As compared to 2002, bi-metal costs per ton increased 19 percent, following the general trend of price increases for aluminum. Costs per ton for the five minority plastic resin types fluctuated widely between 2002 and 2004, with costs per ton for two resin types, PVC #3 and Other #7, increasing by at least 50 percent, and costs per ton for the other three resin types decreasing by between 43 and 50 percent.

The high degree of variation in plastics #3 to #7 costs per ton between the two cost surveys is in large part due to the extremely small sample size and minimal volume recycled for each of these resins. Although the plastics #3 to #7 costs per ton are based on a complete census of eligible sites recycling these resins, there are still very few sites in the overall sample, as illustrated in **Table ES-2**, on the following page. Just one site with particularly high or low overall plastics costs may skew the cost per ton results for a minority resin. One encouraging trend in the plastics #3 to #7 costs per ton seen in 2004, is that the final results fall into a narrower range. In 2002, there was a delta of over $5,000 per ton between the highest and lowest cost resins. In 2004, the delta is less than half that amount, "only" $2,242.

Table ES-1
Statewide Recycler Costs per Ton

	Material Type	2002 Statewide Costs per Ton	2004 Statewide Costs per Ton	Two-Year Percentage Change
1	Glass	$ 79.81	$ 82.45	+3%
2	Aluminum	418.95	465.90	+11%
3	PET #1	479.63	493.31	+3%
4	Bi-Metal	508.18	607.03	+19%
5	HDPE #2	645.91	671.73	+4%
6	PP #5	1,478.77	809.42	-45%
7	Other #7	759.32	1,264.47	+67%
8	PVC #3	1,064.52	1,583.72	+49%
9	LDPE #4	3,324.89	1,889.50	-43%
10	PS #6	6,137.30	3,051.82	-50%

Table ES-2 provides the 2004 and 2002 error rates for the ten material types. Because the costs per ton for plastics #3 to #7 are based on the entire population of recyclers, there are no error rates for those materials. This cost survey has once again generally achieved a higher degree of statistical confidence than any previous cost survey.

Table ES-2 also provides the 2004 sample size for each of the ten material types. The costs per ton for the four major materials, aluminum, glass, PET #1, and HDPE #2, were calculated from a stratified random sample. The bi-metal cost per ton, which is recycled by a much smaller percentage of recyclers overall, was calculated from a simple random sample of 52 sites that recycled bi-metal in 2004. Each of the plastics #3 to #7 recycler costs per ton was calculated from a census of the full population of eligible sites recycling the resin type.

Table ES-2
2004 and 2002 Error Rates and 2004 Sample Size by Material Type

	Material Type	2002 Error Rate (90% Confidence Interval)	2004 Error Rate (90% Confidence Internal)	2004 Sample Size
1	Aluminum	7.82%	5.55%	117
2	Bi-Metal	7.57%	9.83%	52
3	Glass	9.21%	7.35%	115
4	PET #1	9.77%	7.33%	115
5	HDPE #2	9.78%	7.47%	108
6	PVC #3	100% Sample	100% Sample	14
7	LDPE #4	100% Sample	100% Sample	10
8	PP #5	100% Sample	100% Sample	12
9	PS #6	100% Sample	100% Sample	11
10	Other #7	100% Sample	100% Sample	67

C. Cost Survey Tasks

Below are summarized seven of the major tasks that the NewPoint Group team conducted for the processing fee cost survey.

- Developed and documented the sample design framework, and selected recycling centers for the cost survey. NewPoint Group researched the origin and validity of the sample design plan used in previous cost surveys. We made adjustments to improve statistical accuracy of the sample design plan, and determined the number of recycling centers to be selected in each of three sample categories: (1) a stratified random sample used to measure the costs of aluminum, glass, PET #1, and HDPE #2 recycling; (2) a simple random sample used to measure the costs of bi-metal recycling; and (3) a complete census of all sites handling plastics #3 to #7. Following the sample design, NewPoint Group selected recycling sites to participate in the cost survey.
- Updated and calibrated the Labor Allocation Cost Survey Model, an 18-worksheet, Excel-based computer model that is used to allocate recycling center costs to beverage container material types based on labor. NewPoint Group updated the model to reflect 2004 container per pound and CRV payment information, as well as procedural changes to the cost survey. In addition, we calibrated the Indirect Cost Allocation Sub-Models for Aluminum/Bi-Metal and All-Plastics with 2004 survey information. These sub-models, now incorporated into the Labor Allocation Cost Survey Model, ensure proper allocation of costs and labor to plastic resins HDPE #2, PVC #3, LDPE #4, PP #5, PS #6, Other #7, and bi-metal (collectively referred to as minority materials).
- Updated the Cost Survey *Training Manual*. The *Training Manual* (approximately seven hundred (700) pages of reference material) consists of 16 modules, each with detailed descriptions of cost survey background information, procedures, practice exercises, and case studies. NewPoint Group also updated two additional supporting volumes to the *Training Manual*. We updated the *Training Manual* to reflect our practical experience in conducting the 2002 cost survey, as well as procedural changes that have occurred since the *Training Manual* was updated at the beginning of the 2002 cost survey.
- Conducted a 64-hour training session for eight new members of the cost survey teams, and a 24-hour refresher training for fourteen returning members of the cost survey teams. The training, conducted in the Division of Recycling's training room, included lectures, reading, sample exercises, and practical problem-solving. Seven Division of Recycling staff, and over a dozen NewPoint Group team members, participated in the training sessions.
- Scheduled, conducted, and completed 189 recycler site visits during the six months, between April and September 2005, using the statistical sample frame developed by NewPoint Group. Throughout the scheduling and site visits, the NewPoint Group team built on the good working relationships established in 2003 with the program's recyclers. These relationships were important to the success of this cost survey, and will carry over into future cost surveys. None of the 189 sites actually visited were uncooperative to a degree that prevented our team from completing the site files. Most of the cost surveys were conducted by a team of two auditors, a Certified Public Accountant (CPA), and a NewPoint Group, or subcontractor, recycling expert. A summary of completed sites is shown in **Table ES-3**, on the following page.

- Developed and implemented an intensive quality control procedure that included five different levels of review (site team review, independent manager review, CPA partner review, business analyst review, and project director review) for each site file. This review took place before sites files were released for processing. These quality assurance steps ensured that each site file was complete and accurate, and that all results from the labor allocation model and the indirect cost allocation sub-models were accurate. In total, over 30 hours were usually spent for each completed site for the site team and quality control hours.
- Determined final costs per ton. Using an automated process, NewPoint Group extracted results from each of the 189 completed cost models. NewPoint Group developed an Excel workbook to calculate total costs by material type, total volumes by material type, and costs per ton, for each of the ten beverage container material types. Calculations used one of three different methods, depending on the material and sample characteristics: (1) weighted average by strata (aluminum, glass, PET #1, and HDPE #2), (2) simple weighted average (bi-metal), or (3) population weighted average (PVC #3, LDPE #4, PP #5, PS #6, and Other #7). Using defined and documented statistical procedures, NewPoint Group calculated error rates at a 90 percent confidence interval for the five relevant material types.

Table ES-3
2004 Recycler Completed Sites

Recycler Site Category	Number of Unique Site Visits
Stratified Random Sample Sites	117
Plastics Census Sites	51
Bi-Metal Random Sample Sites	21
Total Completed Sites (Some sites had multiple designations)	189

D. Processing Payments and Processing Fees

The processing payment is defined as the difference between the statewide, weighted-average cost of recycling (as determined by this survey), multiplied by a reasonable financial return, and the average scrap value paid to recyclers. The processing payment is paid by the Department to processors, who then pass the payment on to recyclers, based on the weight of material redeemed.

The processing fee, earlier in the history of the beverage recycling program, was equal to the processing payment, and was paid to the Department by beverage manufacturers on every container sold. Over time, the processing fee has been modified, and currently, the amount of processing fee paid by beverage manufacturers is reduced, based on the recycling rate of the material. The difference between the processing fee paid to the Department, and the processing payment paid to recyclers, is made up with funds from

the Beverage Container Recycling and Litter Reduction Fund (Fund), essentially from CRV and processing fees paid on unredeemed containers.

Table ES-4 illustrates the January 1, 2006, processing payments, and processing fees, per ton.

These January 1, 2006 processing payments and processing fees represent modest shifts, compared to 2005, for glass, and more significant shifts for PET #1 and HDPE #2. The processing payment to recyclers for glass increased slightly since 2005, however, the processing fee paid by glass beverage manufacturers decreased by 10 percent from the amount paid in 2005. Processing payments for PET #1 and HDPE #2 decreased between 2005 and 2006, due to increases in scrap value. The processing fees paid by PET #1 and HDPE #2 beverage manufacturers dropped significantly between 2005 and 2006, also due to high scrap values.

Table ES-4
January 1, 2006 Processing Payments and Processing Fees

	Material	Processing Payment (per Ton)	Processing Fee (per Ton)
1	Glass	$ 83.68	$ 8.38
2	PET #1	226.39	40.70
3	HDPE #2	402.65	56.34
4	PVC #3	1,658.89	1,078.20
5	LDPE #4	1,511.58	982.59
6	PP #5	686.77	446.40
7	PS #6	3,085.51	2,006.05
8	Other #7	1,273.97	828.06
9	Bi-Metal	629.44	409.12

I. Introduction

This *Final Summary Report*, *Processing Fee Cost Survey*, presents results of a major primary data, economic cost survey of California certified recycling centers (cost survey). The cost survey was used to estimate California statewide weighted-average, 2004 certified recycler costs per ton, for ten beverage container material types. The cost survey was performed under contract by NewPoint Group Management Consultants, for the California Department of Conservation (Department), Division of Recycling (DOR).

This report summarizes the methodologies used for the cost survey; presents results of the cost survey calculations; and discusses processing payments and processing fees.

This introductory section is organized as follows:

A. Cost Survey Background

B. Cost Survey Objectives

C. Cost Survey Tasks.

A. Cost Survey Background

In 1986, the California State Legislature enacted the California Beverage Container Recycling and Litter Reduction Act (AB 2020). This "bottle bill" program is the only one of its kind in the nation in terms of its unique program structure.

A major subprogram within AB 2020 is processing fees on beverage manufacturers, which are paid to recyclers as processing payments to help cover costs of recycling. Processing fees are arguably one of the more complex aspects of AB 2020.

Most recyclers in the AB 2020 program are required to redeem all beverage container material types. Scrap values of glass, plastics, and bi-metal are not sufficient to cover their cost of recycling. These non-aluminum beverage container recycling costs are subsidized by paying recyclers a processing payment. The cost to recycle beverage containers is determined by a processing fee cost survey.

Public Resource Code Section 14575 directs the DOR to calculate processing payments and fees. Processing payments are defined as the difference between the average cost of recycling a beverage container material in the AB 2020 program, including a reasonable financial return, and the scrap value for the material. The processing fee is imposed on beverage manufacturers, and along with supplemental funds from unredeemed containers, these two sources of funds are used to make the processing payments to recyclers.

If an AB 2020 material scrap value is high enough to cover recycling costs, including a reasonable financial return, no processing fee is imposed. If the scrap value is less than the average statewide recycling costs, including a reasonable financial return, then a processing fee is supposed to make up this difference, or net cost.

Formulating the cost of recycling to determine processing payments and fees is a large cost accounting challenge, rivaling technical requirements of state-of-the-art, activity-based costing techniques used by private industry. The DOR has been innovative in meeting the intent of AB 2020, measuring recycler costs for a system that does not systematically track and measure these costs.

Between 1992 and 2000, processing fees and processing payments were based on legislatively set costs of recycling, as compared to actual measured costs for recycling centers (excluding those receiving handling fees) of receiving, handling, storing, transporting, and maintaining equipment for each container sold using a statistically significant sample of certified recycling centers. SB 332 (Statutes of 1999) required the DOR to conduct cost surveys every third year (starting in year 2000, for the 2001 processing fees).

The DOR conducted a processing fee cost survey in year 2000, using 1999 calendar year costs, for the January 1, 2001 processing fees. This was the first of the "every three year" processing fee cost surveys under SB 332.

The second, "every third year" processing fee cost survey under SB 332 was conducted in 2003, using 2002 calendar year recycling costs, and was used to determine January 1, 2004, processing fees.

Assembly Bill 28 (Statutes of 2003) became effective January 1, 2004. AB 28 moved the measurement of actual recycling costs for processing payments and fees from every three years, to every two years. AB 28 required the DOR to determine the actual costs for certified recycling centers, on and after January 1, 2004, every second year. This current cost survey is the first of the every second year surveys to determine the costs of recycling. The next cost survey after this report will have recycler center costs surveyed in 2007 (using 2006 financial statements), for a processing fee effective January 1, 2008.

B. Cost Survey Objectives

This cost survey was used to estimate costs to recycle aluminum, bi-metal, glass, and plastic (for seven different resin types) beverage containers. Recycler center costs were surveyed in 2005, using recycler center calendar year 2004 financial statements. Recycler center costs measured by this survey were used for the processing fee calculation, effective January 1, 2006.

The recycler costs per ton presented in this report culminate nine intensive months (February through October, 2005) of research, development, and implementation effort on a primary data economic cost survey of California certified recycling centers. The actual cost survey field work was performed over the six month time period, from April through September, 2005.

Historically, processing fees have been imposed on bi-metal, glass, and PET (# 1 resin type) plastic materials. When additional plastic resin types were incorporated into the AB 2020 program in year 2000, a processing fee was established for six additional (# 2 through #7) plastic resin types, based on the costs of recycling PET plastics. In 2003,

actual costs of recycling plastics #2 through #7 were determined for the first time, with the results used to determine the January 1, 2004 processing fees and processing payments. **Table I-1**, below, defines plastic beverage container resin types.

Table I-1
Plastic Resin Types

Plastic Resin	Abbreviation
Polyethylene terephthalate	PET #1
High density polyethylene	HDPE #2
Polyvinyl chloride (vinyl)	PVC #3
Low density polyethylene	LDPE #4
Polypropylene	PP #5
Polystyrene	PS #6
Other plastic resins/ blended resins	Other #7

The cost survey in this report is the second time that actual recycling costs have been determined for bi-metal beverage containers, and all the new plastic material type containers added to the AB 2020 program since January 1, 2000 (i.e., plastic resins HDPE (# 2), PVC (# 3), LDPE (# 4), PP (# 5), PS (# 6), and Other (# 7)). Under this cost survey recycling costs for the second time have been determined for ten different material types, including the four "major" material types (aluminum, glass, PET #1, and HDPE #2), and the six "minor" material types (# 3 to #7 plastics, and bi-metal).

This cost survey is the largest cost survey (189 unique sites for 2004 versus 181 unique sites for 2002) undertaken by the DOR to-date. The NewPoint Group team completed 189 unique recycler cost surveys to obtain these cost survey results.

This processing fee cost survey is also the most detailed and complex (one stratified random sample, one simple random sample, and one census survey) of any prior cost survey, in terms of quantitative information obtained. Finally, this cost survey is the most accurate cost survey yet undertaken, generally exceeding the already high level of accuracy obtained in 2002.

C. Cost Survey Tasks

Below, we summarize seven major tasks that the NewPoint Group team conducted for the processing fee cost survey.

1. **Developed and documented the sample design framework, and selected recycling centers for the cost survey**. NewPoint Group researched the origin and validity of the sample design plan used in previous cost surveys. We made adjustments to improve the statistical accuracy of the sample design plan, and determined the number of recycling centers to be selected in each of three sample categories: (1) a stratified random sample used to measure the costs of aluminum, glass, PET #1, and HDPE #2 recycling; (2) a simple random sample used to measure the costs of bi-metal recycling; and (3) a complete census of all sites handling plastics #3 to #7. Following the sample design, NewPoint Group selected recycling sites to participate in the cost survey.

2. **Updated and calibrated the Labor Allocation Cost Survey Model**, an 18-worksheet, Excel-based computer model that is used to allocate recycling center costs to beverage container material types based on labor. NewPoint Group updated the model to reflect 2004 container per pound and CRV payment information, as well as procedural changes to the cost survey. In addition, we calibrated the Indirect Cost Allocation Sub-Models for Aluminum/Bi-Metal and All-Plastics with 2004 survey information. These sub-models, now incorporated into the Labor Allocation Cost Survey Model, ensure proper allocation of costs and labor to plastic resins HDPE #2, PVC #3, LDPE #4, PP #5, PS #6, Other #7, and bi-metal.

3. **Updated the Cost Survey *Training Manual***. The *Training Manual* (approximately seven hundred (700) pages of reference material) consists of 16 modules, each with detailed descriptions of cost survey background information, procedures, practice exercises, and case studies. NewPoint Group also updated two additional supporting volumes to the *Training Manual*. We updated the *Training Manual* to reflect our practical experience in conducting the 2002 cost survey, as well as procedural changes that have occurred since the *Training Manual* was last updated at the beginning of the 2002 cost survey.

4. **Conducted a 64-hour training session for eight new members of the cost survey teams, and a 24-hour refresher training session for fourteen returning members of the cost survey teams**. The training, conducted in the Division of Recycling's training room, included lectures, reading, sample exercises, and practical problem-solving. Seven Division of Recycling staff, and over a dozen NewPoint Group team members, participated in the training sessions.

5. **Scheduled, conducted, and completed 189 recycler site visits** during the six months, between April and September 2005, using the statistical sample frame developed by NewPoint Group. Throughout the scheduling and site visits, NewPoint Group team built on the working relationships established in 2003 with the program's recyclers. These relationships were important to the success of this cost survey, and will carry over into future cost surveys. None of the 189 sites actually visited were uncooperative to a degree that prevented our team from completing the site files. Most of the cost surveys were conducted by a team of two auditors, a Certified Public Accountant (CPA), and a NewPoint Group, or subcontractor, recycling expert. A summary of completed sites is shown in **Table I-2**, on the following page.

Table I-2
2004 Recycler Completed Sites

Recycler Site Category	Number of Unique Site Visits
Stratified Random Sample Sites	117
Plastics Census Sites	51
Bi-Metal Random Sample Sites	21
Total Completed Sites *(Some sites had multiple designations)*	189

6. **Developed and implemented an intensive data quality control procedure** that included five different levels of review (site team review, independent manager review, CPA partner review, business analyst review, and project director review) for each site file. This review took place before site files were released for processing. These quality assurance steps ensured that each site file was complete and accurate, and that all results from the labor allocation model and the indirect cost allocation sub-models were accurate. In total, over 30 hours were generally spent for each completed site for the site team and quality control hours.

7. **Determined final costs per ton**. Using an automated process, NewPoint Group extracted results from each of the 189 completed cost models. NewPoint Group developed an Excel workbook to calculate total costs by material type, total volumes by material type, and costs per ton, for each of the ten beverage container material types. Calculations used one of three different methods, depending on the material and sample characteristics: (1) weighted average by strata (aluminum, glass, PET #1, and HDPE #2), (2) simple weighted average (bi-metal), or (3) population weighted average (PVC #3, LDPE #4, PP #5, PS #6, and Other #7). Using defined and documented statistical procedures, NewPoint Group calculated error rates at a 90 percent confidence interval for the five relevant material types.

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II. Cost Survey Methodologies

This section describes the cost survey methodologies, from establishing the survey sample frame, to the quality control procedures, and all the supporting tasks in between. There are eight key tasks described in this section:

A. *Survey Design*

B. *Survey Scheduling, Logistics, and Confidentiality*

C. *Training Manual Updates*

D. *Surveyor Training*

E. *Cost Model Updates*

F. *Indirect Cost Allocation Sub-Models*

G. *Cost Survey Procedures*

H. *Quality Control and Confidentiality Procedures.*

A. Survey Design

NewPoint Group, for the first time, developed the survey design for the cost survey. NewPoint Group reviewed and revised the prior survey design elements, and developed detailed statistical recommendations that provide a more efficient and accurate survey design for this, and future cost surveys.

The purpose of the survey design was to identify the specific recycling centers surveyed during 2005, to estimate California, statewide weighted-average, 2004 certified recycler center costs per ton, for ten beverage container material types. Recycler center costs were surveyed in 2005, using recycler center calendar year 2004 financial statements. Recycler center costs measured by the cost survey were used for the processing fee calculation, effective January 1, 2006.

The population of recycling centers eligible for the cost survey was defined as all recycling centers (1) not receiving handling fees, (2) operational at least eight months, during the period November 2003 to October 2004, and (3) certified operational as of March 1, 2004. There were 674 recycling centers in this total traditional recycling center population.

To measure calendar year 2004 costs, the survey design consisted of three components:

- A newly refined, statistically defensible, stratified random sample, drawn from the 674 qualifying recycling centers. Three stratums were defined by the total annual volume (tons) of glass handled by a site. This stratified random sample was used to measure the costs of CRV aluminum, glass, PET #1, and HDPE #2 recycling.
- A complete census of all recycling centers that handled CRV plastics #3 to #7 containers in 2004. This sample was used to measure the costs of CRV plastics #3 to #7 recycling.
- A new simple random sample, drawn from all recycling centers that handled bi-metal containers in 2004. This simple random sample was used to measure the costs of CRV bi-metal recycling. (In 2003, a hybrid, non-random sample, was used to estimate bi-metal costs.)

The above three survey components were treated equivalently in terms of scheduling, site visits, and quality control. It was only in the statistical calculations that a distinction was made between the three groups. As a result of this "next generation" survey design, the cost survey conducted during 2005, was the first time that the DOR formally treated all 10 CRV material types with equal statistical rigor.

To increase precision, and confidence in random sample results for all recycling centers, while minimizing overall sample size, the traditional recycling center population was divided into three strata, based on glass volume, as shown in **Table II-1**, below. These stratum definitions were slightly revised from the prior cost surveys to statistically optimize this sample survey. (Stratum 1 and 2 cut-off points previously were 500 tons, versus the 550 tons now.)

Table II-1
Stratum Definitions

Stratum	Annual Glass Volume
1	Greater than, or equal to, 550 tons
2	Greater than, or equal to 150 tons, up to 549 tons
3	Less than 150 tons

Departmental regulations require that the cost per ton be estimated at an 85 percent confidence interval, and Division of Recycling policy further specifies a 10 percent error rate. For the first time, the sampling plan (for both samples) was based on a more accurate and statistically conventional and accepted, 90 percent confidence interval, with a 10 percent error rate.

Table II-2, below, provides a summary of the completed survey sites. NewPoint Group scheduled, conducted, and completed 189 recycler site visits and cost analyses. Many sites in Table II-2 have multiple designations. For example, some plastic census sites were de facto chosen in the stratified random sample and the bi-metal random sample. Likewise, some bi-metal random sample sites were de facto chosen in the stratified random sample and the plastic census.

Table II-2
2004 Recycler Completed Sites

Recycler Site Category	Number of Unique Site Visits
Stratified Random Sample Sites	117
Plastics Census Sites	51
Bi-Metal Random Sample Sites	21
Total Completed Sites (Some sites had multiple designations)	189

The 2004 cost survey was the largest cost survey undertaken to-date, with 189 unique sites. In 2002, there were 181 unique sites. In addition, the 2004 cost survey was the most detailed quantitatively, and complex overall survey to-date, with one stratified random sample, one simple random sample, and one census survey.

Table II-3, on the following page, provides a comparison of the confidence levels, and the number of non-unique sites surveyed, for 2004 versus 2002. The 2004 survey had generally improved error rates in spite of the efficient lower number of 2004 random sites surveyed (117 unique random sites in 2004, versus 136 unique random sites in 2002). The overall higher degree of statistical confidence, and lower error rates for this survey, compared to previous surveys, is notable given the smaller stratified random sample size used. This degree of accuracy reflects increased experience of the survey teams and the extensive data quality control processes built into this cost survey.

Error rates for 2004 were less than 10 percent for all five relevant material types. Also, error rates at the 90 percent confidence level were lower than error rates in 2002, for all materials except bi-metal. This 2004 cost survey represents the first time that the bi-metal cost per ton was based on a true random sample. Although the 2004 bi-metal error rate is slightly higher than 2002, it is still below the 10 percent error rate that was targeted.

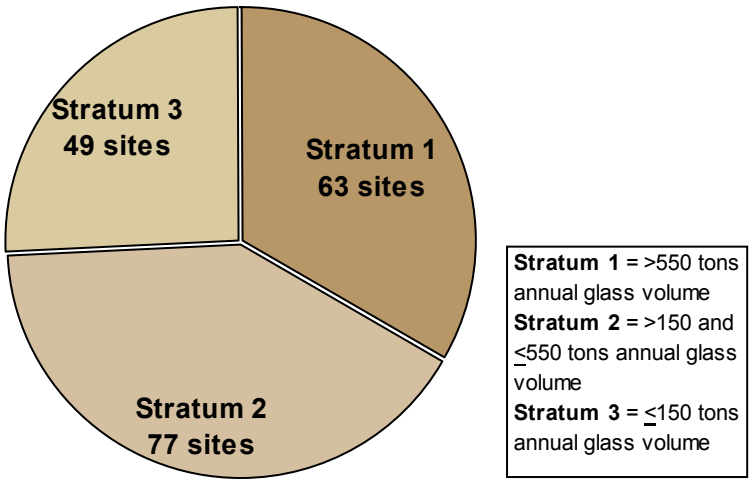
Aluminum had the most number of non-unique sites surveyed, with a total of 117 sites. Plastics #4 had the least number of non-unique sites surveyed, with a total of only 10 sites.

Figure II-1, following Table II-3, for information purposes, shows the total sample size by stratum. A total of 189 unique sites were surveyed. Twenty-six (26) percent of the sites surveyed were Stratum 3 sites, thirty-three (33) percent of the sites surveyed were Stratum 1 sites, and finally forty-one (41) percent of the sites surveyed were Stratum 2 sites.

Table II-3
Comparison of Confidence Levels and Number of Sites Surveyed, 2002 and 2004

Material Type		2002 Error Rate (90% Confidence Level)	2004 Error Rate (90% Confidence Level)	2002 Number of Non-Unique Sites	2004 Number of Non-Unique Sites
1	Aluminum	7.82%	5.55%	136	117
2	Bi-Metal	7.57%	9.83%	65	52
3	Glass	9.21%	7.35%	131	115
4	PET #1	9.77%	7.33%	132	115
5	HDPE #2	9.78%	7.47%	119	108
6	PVC #3	100% Sample	100% Sample	23	14
7	LDPE #4	100% Sample	100% Sample	11	10
8	PP #5	100% Sample	100% Sample	11	12
9	PS #6	100% Sample	100% Sample	12	11
10	Other #7	100% Sample	100% Sample	49	67

Figure II-1
Total Sample Size, 189 Unique Sites, By Stratum



B. Survey Scheduling, Logistics, and Confidentiality

A significant component of the cost survey involved scheduling site visits and the communication interface with recyclers chosen from the sample frame. One staff-person at NewPoint Group was employed full-time during the survey months (April to September) to coordinate scheduling, and communicate with recyclers. A second staff person provided assistance in scheduling.

Because conducting a cost survey fundamentally entails the collection of proprietary financial information, sensitivity to stakeholder relations is highly important. Without willing and active cooperation from the selected recycling center operators, determining the real costs of beverage container processing would be exceptionally difficult, and the results would be hard to support.

Our approach was to communicate with the site operators and managers from the start of the process to help them understand what the cost survey entails, what information we were looking to obtain, and, perhaps most importantly, to correct misunderstandings about the purpose of the cost survey.

The first stage of recycler communication was a letter, on Department letterhead, informing the recycler that they were selected to participate in the processing fee cost survey. The letter also identified the expectations of the recycler, and introduced NewPoint Group as the DOR contractor. Introduction letters were sent to all selected recyclers in early April 2005.

In the second stage of communication, the NewPoint Group scheduling coordinator or scheduling assistant made telephone contact with recyclers. Sites were initially prioritized based on location and complexity of sites.

After scheduling a site visit appointment (usually for first thing in the morning or first thing in the afternoon), the scheduling coordinator sent or faxed the recycler a second letter confirming the date, and time, of the site visit.

The survey team also contacted the recycler directly, one or two days before the site visit, for final visit confirmation. Site visits were generally conducted by a team of two surveyors, a CPA and a recycling expert. Survey teams made their own travel arrangements.

The coordinator conducted many behind the scenes tasks to ensure the overall success of the project. For example, to reduce travel expenses, the coordinator utilized specialized mapping software to schedule consecutive site visits in nearby locations. In addition, the coordinator was tasked to optimize site visit efficiency, matching the varying schedules of fourteen site survey team personnel, diverse geographic locations, and the availability of the 189 recycling centers. During any given week, up to five different two-person survey teams were in the field. **Table II-4**, on the following page, shows the number of site visits conducted by month. One site visit, with some telephone follow-up, was sufficient to obtain all the information needed to complete the survey of each site.

Table II-4
Cost Survey Site Visits by Month

Month (2005)	Number of Site Visits
1. April	18
2. May	66
3. June	39
4. July	30
5. August	29
6. September	7
TOTAL	189

The coordinator maintained a secure File Transfer Protocol (FTP) server as a single point of distribution for confidential cost model templates, scheduling information, and cost model forms. To ensure confidentiality of recyclers' proprietary information, every NewPoint Group and subcontractor employee that worked on the processing fee cost survey contract signed individual Confidentiality Agreements warranting that they would not disclose any information made available by each certified recycler. Also, each company contractor – NewPoint Group, Inc. (Prime Contractor), Perry-Smith, LLP (Subcontractor), Geiss Consulting (Subcontractor), and Leon E. Tuttle, CPA (Disabled Veteran Business Enterprise Subcontractor) - also signed company Confidentiality Agreements.

C. Training Manual Updates

The first *Processing Fee Cost Survey Training Participant Manual* was prepared by NewPoint Group in 1995 to support the cost survey training provided to DOR staff at that time. This manual contained hundreds of example case studies, problem sets, quizzes, sample financial documents, handouts, reading assignments, and procedures to develop skills needed to conduct successful processing fee cost surveys.

The *Training Manual* (approximately seven hundred (700) pages of reference material) consists of 16 modules, each with detailed descriptions of cost survey background information, procedures, practice exercises, and case studies. NewPoint Group updated the *Training Manual* to reflect our practical experience in conducting the 2002 cost survey, as well as procedural changes that have occurred since the *Training Manual* was last updated at the beginning of the 2002 cost survey. We also updated two additional supporting volumes to the *Training Manual*.

D. Surveyor Training

Successfully completing the processing fee cost survey site visits required knowledge of recycling, recycling practices, the beverage container recycling program, the specific procedures of site visits, auditing, and financial cost-accounting. The NewPoint Group trained surveyor team consisted primarily of CPAs and recycling experts.

Ten of the fourteen individuals who conducted site visits for this survey had

previous experience in the 2002 processing fee cost survey, and had completed the full 64-hour training session in 2003. These surveyors already had extensive experience in auditing and financial accounting procedures, as well as practical site-visit and recycling program experience. However, returning team members still completed a 24-hour refresher course, along with several DOR staff. The remaining four survey team members, as well as several DOR staff, completed the full 64-hour training program.

Classroom training consisted of 64 hours of in-class lectures, reading, exercises, and problem solving. The training was held at the DOR offices, and was conducted over a three-week period, during March 2005.

E. Cost Model Updates

The labor allocation cost model (cost model) is an *Excel* workbook consisting of 18 worksheets. The model was first developed by NewPoint Group to improve the methodology of the 1995 cost surveys. Since that time it has been updated and revised to accommodate legislative and regulatory changes, as well as upgrades of *Excel*. In 2000, NewPoint Group and the DOR conducted a significant revision to add plastic resins #2 to #7 to the model, and to upgrade to *Excel 1997*, which replaced old *Excel* macros with *Visual Basic* programming.

The current version of the cost model represents several legacy generations (and layers) of modifications and updates, including a significant number of improvements that were made immediately following the 2002 cost survey. Prior to conducting the current cost survey, NewPoint Group reviewed and updated the model to reflect 2004 container per pound and CRV payment information, as well as procedural changes to the cost survey.

F. Indirect Cost Allocation Sub-Models

As a result of the introduction of new containers to the Beverage Container Recycling Program in 2000, this cost survey was the second time that the cost per ton was calculated for different plastic resins, other than PET #1, and the second time that actual costs for bi-metal were determined. A key task of the previous cost survey project was to develop a costing methodology for plastics #2 to #7. For this cost survey, we applied this same indirect cost allocation sub-model procedure to determine costs per ton for the minority material types.

The purpose of the two sub-models, the Indirect Cost Allocation Sub-Model for All Plastics, and the Indirect Cost Allocation Sub-Model for Aluminum/Bi-Metals, was to separate the individual majority and minority material costs from the larger indirect cost categories, all plastics and aluminum/bi-metal. Using operational and material handling factors, the sub-models provide a consistent, site-specific, and sub-material specific approach, for determining the costs per ton for both the high-volume majority materials, and low-volume minority materials.

Four operational/material handling factors (weight, number of containers, volume (size) of containers, and commingled rate), along with a weighting allocation across these

factors, formed the basis of the indirect cost allocation sub-models for the two majority, and seven minority, materials (glass does not require a sub-model). A major change from the 2002 cost survey was that the sub-models were integrated into the Labor Allocation Cost Model for each site.

G. Cost Survey Procedures

There were three phases of an individual cost survey:

- Pre-site visit – model population, data review, and travel logistics
- On-site visit – site tour, cost survey, and labor interviews
- Post-site visit - data entry, analysis, and follow-up.

Pre-Site Visit

Before conducting the on-site cost survey, the survey team obtained all available information about that site. Recycling volumes for 2004 were entered into the cost model *Excel* file for each site. The survey team evaluated the volume information to identify the approximate size and scope of the survey. For this cost survey, NewPoint Group did not attempt to obtain financial information prior to the site visit (a practice that was problematic in the previous survey). Much of the pre-site visit time was spent on travel logistics and mapping.

On-Site Visit

Each site visit typically lasted from two to four hours, depending on the size and complexity of the site. The primary data-gathering effort took place during the site visit. Survey teams carefully followed procedures outlined in the *Training Manual, Volume 1*. The survey team first toured the site with site management to view and inquire about the site's operations, including materials handled, equipment, recycling procedures, material shipping, etc.

Another key task was reviewing the financial information with site management, or a financial officer, to identify and categorize allowable and non-allowable costs for calculating processing fees, direct and indirect costs, and beverage container indirect (BCI) and all materials indirect (AMI) costs.

The next key task was conducting structured labor allocation interviews to determine allocation of each employee's time first to recycler, processor, or other business, then to direct yard labor or all other labor, and finally by CRV material type or other non-CRV material type. The cost model used this labor allocation information to allocate indirect costs and wages.

Post-Site Visit

After the site visit, the survey team spent from four to ten or more hours further compiling the data, entering information into the cost model, completing the site memorandum and site file, and reviewing the site file. In many cases, site managers did not have all the necessary information available at the site visit, and the survey team had to telephone to request additional information, or to ask specific questions about the data.

Following the site visit, the team entered the labor information for each employee, as well as the cost summary and direct cost

information into the cost model. Once the data were entered into the cost model, the model calculated costs per ton for all of the CRV material categories recycled at the site. Finally, the survey team compiled and checked all workpapers, and conducted a reasonableness check of survey results before passing the site file on to a manager for the first of several independent office review steps.

H. Quality Control and Confidentiality Procedures

Data quality control (QC) was a primary focus of the cost survey project. Quality control procedures included five separate levels of review and totaled on-average 13 hours per site. These data QC procedures were essential to ensure that the cost survey results were fair, equitable, accurate, reasonable, justifiable, and defensible.

This extensive quality control process, with five different individuals or teams, ensured that each site file was complete and accurate. Files that did not meet all the quality control criteria were returned to the original survey team for corrections, if appropriate. Only after this extensive series of quality control reviews was the data used for the final cost per ton calculations, described in Section III.

Confidentiality was important for the cost survey. The data from each recycling site were not to be disclosed, as release of the data could potentially be compromising to a recycler. As a result, NewPoint Group developed formal policies regarding confidentiality. Each project team member signed an Employee Confidentiality statement, and in addition, each project team firm signed a similar statement. Records from each site were maintained securely at the NewPoint Group offices after they were completed, and printouts and drafts with site-specific information were shredded. The final site files were delivered to the DOR for their record retention. Computers were protected against unauthorized access through use of project passwords. All electronic files related to site visits were stored on a secure server, accessible by password only, to survey team members.

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III. Cost Calculations and Results

This section describes the calculations used, and the final results for, the statewide cost per ton for recycling each of the ten beverage container material types in the California Beverage Container Recycling program. Also, this section includes a comparison of 2004 costs per ton derived from this cost survey with those costs per ton measured in 2002. This section is organized as follows:

A. *Cost Calculations*

B. *Cost Results*

C. *Comparison of Cost Results.*

A. Cost Calculations

Three different approaches to determining the cost per ton for recycling were used, depending on the material type. The three approaches are described below, and summarized in **Exhibit III-1**, on the following page.

Approach A: Aluminum, Glass, PET #1, and HDPE #2 – most recyclers in the total population accept and recycle these four material types[1]. As a result, for these materials, a weighted (by stratum) average statewide cost per ton was used. There were 117 recyclers in the random sample, divided into three strata. Within each of the three sample strata, the total sample costs and the total sample volumes were determined. The DOR provided the 2004 volume data for the sample and population. The average cost per ton by stratum, equal to the total cost divided by the total volume for the stratum, was then calculated. This figure was multiplied by the stratum population volume, to determine the total population costs for each stratum, for each material type. The statewide, weighted-average cost-per-ton was calculated by summing the three strata total population costs, then dividing by the total population volume. The approach is illustrated in *Exhibit III-1a*.

Approach B: Bi-Metal – bi-metal was recycled by only 165 out of the 674 recyclers in the total population. The bi-metal random sample consisted of 52 of the 165 sites that recycled bi-metal in 2004. The cost per ton for bi-metal was determined by summing the total costs and total volumes for all 52 sites in the random bi-metal sample, then dividing the total cost by the total volume from those sites, for a simple weighted cost-per-ton. The approach is illustrated in *Exhibit III-1b*.

Approach C: Plastics #3 to #7 – only 72 sites out of the 674 recyclers in the total population recycled any of plastics #3 to #7 resins in 2004. As a result, the entire population of recyclers reporting each of the five resin types was surveyed. The cost per ton was calculated by summing the total cost for each resin and dividing by the total volume for each resin, for a simple weighted average cost-per-ton. The approach is illustrated in *Exhibit III-1c*.

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[1] Somewhat fewer recyclers accept HDPE #2, but the number of HDPE #2 recyclers was still quite large, although the volumes were significantly less than for the other three materials, aluminum, glass, and PET #1.

Exhibit III-1
Cost Calculations

a. Approach A: Aluminum, Glass, PET #1, and HDPE #2

$$\frac{\text{Stratum 1 Sample Costs}}{\text{Stratum 1 Sample Volumes}} \times \text{Stratum 1 Population Volumes} = \text{Stratum 1 Total Population Costs}$$

$$+$$

$$\frac{\text{Stratum 2 Sample Costs}}{\text{Stratum 2 Sample Volumes}} \times \text{Stratum 2 Population Volumes} = \text{Stratum 2 Total Population Costs}$$

$$+$$

$$\frac{\text{Stratum 3 Sample Costs}}{\text{Stratum 3 Sample Volumes}} \times \text{Stratum 3 Population Volumes} = \text{Stratum 3 Total Population Costs}$$

$$\frac{\text{Stratum 1 Total Population Costs} + \text{Stratum 2 Total Population Costs} + \text{Stratum 3 Total Population Costs}}{\text{Total Population Volumes}} = \text{Statewide Weighted-Average Cost Per Ton}$$

b. Approach B: Bi-Metal

$$\frac{\text{Total Bi-Metal Random Sample Costs (52 sites)}}{\text{Total Bi-Metal Random Sample Volume (52 sites)}} = \text{Bi-Metal Random Sample Cost Per Ton}$$

c. Approach C: Plastics #3 to #7

$$\frac{\text{Total Resin Population Costs}}{\text{Total Resin Population Volumes}} = \text{Resin Population Cost Per Ton}$$

Financial Return

By statute, recycling costs per ton used to determine the processing fees and payments are to include a reasonable financial return. DOR regulations require that the financial return figure, which is multiplied by the cost per ton, is the "average return on costs for the Scrap and Waste Materials Industry (SIC 5093), as determined from data contained in the most recent Dun and Bradstreet Standard Three Year Norm Report" (California Code of Regulations, §2975).

The reasonable financial return (RFR) used for this cost survey was 5.43 percent, based on an average return on costs for SIC 5093 in 2004, as determined by Dun & Bradstreet.

This RFR represents an increase in the RFR compared to the past two years (2.55 percent in 2004 and 3.60 percent in 2005).

B. Cost Results

The costs per ton to recycle for each of the ten material types, with, and without the reasonable financial return, are summarized in **Table III-1**, below. Table III-1 also shows the sample size for each of the ten material types.

Table III-2, on the following page, provides the costs per ton (without financial return) in rank order. The costs per ton fall into six general cost ranges. Glass has the lowest cost, less than $100 per ton. Aluminum, and PET #1 costs are in the next range, $400 to $500 per ton. HDPE #2 and Bi-Metal are in the next cost range, $600 to $700 per ton. PP #5 and Other #7 are in the next cost range, $800 to $1,300 per ton. PVC #3 and LDPE #4 are next, in the $1,500 to $2,000 per ton range. Finally, PS #6 is in the highest cost group, with a cost per ton in the $3,000 range.

Table III-1
Statewide 2004 Costs per Ton to Recycle

	Material	Cost per Ton without Financial Return	Cost per Ton with Financial Return [a]	N = Sample Number of Sites [b]
1	Aluminum	$ 465.90	$ 491.20	117
2	Glass	82.45	86.93	115
3	PET #1	493.31	520.10	115
4	HDPE #2	671.73	708.20	108
5	Bi-Metal	607.03	639.99	52
6	PVC #3	1,583.72	1,669.72	14
7	LDPE #4	1,889.50	1,992.10	10
8	PP #5	809.42	853.37	12
9	PS #6	3,051.82	3,217.53	11
10	Other #7	1,264.47	1,333.13	67

[a] The RFR is 5.43%.

[b] Overall, 189 sites were completed to obtain these results.

Table III-2
Statewide 2004 Costs per Ton in Rank Order

	Material	Cost per Ton without Financial Return
1	Glass	$ 82.45
2	Aluminum	465.90
3	PET #1	493.31
4	Bi-Metal	607.03
5	HDPE #2	671.73
6	PP #5	809.42
7	Other #7	1,264.47
8	PVC #3	1,583.72
9	LDPE #4	1,889.50
10	PS #6	3,051.82

Error Rates and Confidence Intervals for Costs per Ton

The California Beverage Container Recycling and Litter Reduction Act, §14575, requires the DOR to conduct "a survey of a statistically significant sample of certified recycling centers, excluding those receiving a handling fee." In the California Code of Regulations, a "statistical sample" is defined as an estimate with an 85 percent confidence level (§2000 (a) (47)). Internal DOR policy further establishes a 10 percent error rate.

In developing the sample design, NewPoint Group determined that, rather than set the sample to achieve an 85 percent confidence interval and then add oversample, it would be more statistically accurate to set the confidence interval higher, at 90 percent. Thus, the sample size was developed, based on 2002 cost survey results, to achieve a 90 percent confidence interval with a 10 percent error rate. Only after the survey was complete could it be determined whether the actual specification of a 90 percent confidence interval, and the target of a 10 percent error rate, were met.

The analysis of the final data shows that, for the second time, the processing fee cost survey met and exceeded all the a priori statistical requirements (the survey of 2002 recycler costs also met and exceeded these requirements). In all cases the error rate at the 90 percent confidence level was below 10 percent. The error rate at the 90 percent confidence interval for each of the five relevant materials is provided in **Table III-3**, on page III-6. For comparison, Table III-3 also provides the error rates at the 90 percent confidence interval for each of the five relevant material types, aluminum, glass, PET #1, HDPE #2, and bi-metal from the 2002 processing fee cost survey.[2]

It was a significant accomplishment to achieve the error rate goals in this cost survey as compared to previous surveys, particularly in light of the reduced sample size as compared to 2002. There are two reasons for the improved error rates. The first reason is that the NewPoint Group methodology

[2] The bi-metal error rate at the 90 percent confidence interval is slightly higher in 2004, as compared to 2002. However, for the first time, the 2004 bi-metal sample was a statistically valid random sample drawn specifically for bi-metal, as opposed to the "hybrid" sample of available sites that was used in 2002 to determine bi-metal costs per ton.

continued to include extensive site file oversight and quality control review. Five levels of review were conducted for each site. The second reason is the experience of the cost survey team. Ten of the fourteen individuals that conducted site visits had experience in 2002, and for the most part, those that did not have prior survey experience were knowledgeable about the recycling program.

C. Comparison of Cost Results

Table III-4, following Table III-3, provides a summary comparison of the results of the 2004 and 2002 cost surveys, and the percent change in costs between 2002 and 2004. Overall, results between the two years were highly stable.

As compared to 2002 costs per ton, aluminum increased 11 percent, and costs per ton for glass and PET #1 each increased by 3 percent. The aluminum trend line is consistent with what we have seen historically, with aluminum costs steadily rising. PET #1 costs per ton have historically been decreasing with increasing volumes, as market share shifts from aluminum to PET #1. However, the higher PET #1 volumes in 2004 were not enough to overcome generally higher recycling costs, resulting in a 3 percent increase in PET #1 costs over 2002. The glass recycling cost per ton also increased slightly, though it continues to be relatively stable, as it has been over the last several years, at about $80 per ton.

Costs per ton for the other seven materials were calculated for the first time in 2002, thus the results in Table III-4 represent the first comparison of costs per ton between sequential cost surveys. Similar to PET #1, costs per ton for HDPE #2 increased slightly from 2002, at 4 percent, an increase that occurred even in light of significant volume increases in HDPE #2 recycling. As compared to 2002, bi-metal costs per ton increased 19 percent, following the general trend of price increases for aluminum. Costs per ton for the other five minority plastic resins fluctuated widely between 2002 and 2004, with costs per ton for two resin types, PVC #3 and Other #7, increasing by at least 50 percent, and costs per ton for the other three resin types decreasing by between 43 and 50 percent.

This high degree of variation in plastics #3 to #7 costs per ton between the two cost surveys is in large part due to the extremely small sample size and minimal volume recycled for each of these resins. Although the plastics #3 to #7 costs per ton are based on a complete census of eligible sites recycling these resins, there are still very few sites in the overall sample, as illustrated in Table III-1. Just one site with particularly high or low overall plastics costs may skew the cost per ton results for a minority resin. One encouraging trend in the plastics #3 to #7 costs per ton seen in 2004, is that the final results fall into a narrower range. In 2002, there was a delta of over $5,000 per ton between the highest and lowest cost resins. In 2004, the delta is less than half that amount, “only” $2,242.

Table III-3
2004 and 2002 Error Rates

Material Type	2004 Error Rate at 90% Confidence Interval	2002 Error Rate at 90% Confidence Interval
Aluminum	5.55%	7.82%
Glass	7.35	9.21
PET #1	7.33	9.77
HDPE #2	7.47	9.78
Bi-Metal	9.83	7.57

Table III-4
Summary Comparison of 2004 and 2002 Cost Survey Results

Material Type		2002 Statewide Cost per Ton[a]	2004 Statewide Cost per Ton[a]	Percent Change, 2002 to 2004
1	Aluminum	$418.95	$465.90	11%
2	Bi-Metal	508.18	607.03	19%
3	Glass	79.81	82.45	3%
4	PET #1	479.63	493.31	3%
5	HDPE #2	645.91	671.73	4%
6	PVC #3	1,064.52	1,583.72	49%
7	LDPE #4	3,324.89	1,889.50	-43%
8	PP #5	1,478.77	809.42	-45%
9	PS #6	6,137.30	3,051.82	-50%
10	Other #7	759.32	1,264.47	67%

[a] Without RFR

IV. Processing Payments and Processing Fees

This section describes how processing payments and processing fees are calculated. The section is organized as follows:

A. Processing Payment and Processing Fee Calculations

B. Scrap Value Trends.

A. Processing Payment and Processing Fee Calculations

Section 14575(a) of the California Beverage Container Recycling and Litter Reduction Act specifies that: "if any type of empty beverage container with a refund value established pursuant to Section 14560 has a scrap value less than the cost of recycling, the Department shall, on January 1, 2000, and on or before January 1 annually thereafter, establish a processing fee and a processing payment for the container, by the type of the material of the container."

The processing payment is defined as the difference between the statewide weighted average cost of recycling (as determined by this survey), multiplied by a reasonable financial return, and the average scrap value paid to recyclers (for the period October through September of the previous year). The equation is as follows:

Processing Payment = (Cost of Recycling x Reasonable Financial Return) – (Scrap Value)

The processing payment is paid by the Department to processors, who then pass the payment on to recyclers, based on the weight of material redeemed.

The processing fee, is imposed on beverage manufacturers, and along with supplemental funds from unredeemed containers, these two sources of funds are used to make the processing payments to recyclers. Processing fees are assessed on each container sold to beverage manufacturers.

Under current statutory requirements, the processing fee for a given container type is equal to a specified percentage of the processing payment, depending on the recycling rate in the previous fiscal year, as shown in **Table IV-1**, on the following page.

Processing payments and processing fees effective January 1, 2006, are based on calendar year 2004 costs (measured in 2005), containers per pound rates effective January 1, 2006, and the statewide average scrap values from October 2004, through September 2005.

Table IV-1
Processing Fee Reduction Factors

Recycling Rate	Percent of Processing Payment
75 percent or above	10 percent
65 to 74 percent	11 percent
60 to 64 percent	12 percent
55 to 59 percent	13 percent
50 to 54 percent	14 percent
45 to 49 percent	15 percent
40 to 44 percent	18 percent
30 to 39 percent	20 percent
Less than 30 percent	65 percent

The fiscal year 2004/2005 recycling rates were used to determine the processing fee reduction factors for glass, bi-metal, and the seven plastic resins, as shown in **Table IV-2**, in the next column.

The processing fee reduction factor is multiplied by the processing payment for each material to determine the amount of processing fee paid by beverage manufacturers. The remaining processing payment is covered by the Fund.

Table IV-3, on the following page, is a copy of the 2006 Processing Payments and Fees notice, published by the Department on December 5, 2005. The table provides the components of the processing payment and processing fee equations, as well as the processing payments per ton, pound, and containers, and the processing fees per container.

This table identifies one additional reduction of the processing fee, for glass, based on Section 14575(k). Section 14575(k) states that, if glass or PET #1 recycling rates equal or exceed 45 percent in the previous year, and there are sufficient surplus funds in the respective glass and PET #1 processing fee accounts, then the processing fees may be reduced for each of these two materials by an additional $2 million. This reduction was applied to glass for the January 1, 2006 processing fee, with an additional reduction in the processing fee of $0.00068 per container sold.

Table IV-2
Processing Fee Reduction Factors for January 1, 2006 Processing Fees

Material	FY 04/05 Recycling Rate	Processing Fee Reduction Factor
Glass	58 Percent	13 Percent
PET #1	42 Percent	18 Percent
HDPE #2	51 Percent	14 Percent
PVC #3	1 Percent	65 Percent
LDPE #4	0.1 Percent	65 Percent
PP #5	2 Percent	65 Percent
PS #6	0.3 Percent	65 Percent
Other #7	9 Percent	65 Percent
Bi-Metal	6 Percent	65 Percent

Table IV-3
Processing Payments and Fees Public Notice, December 5, 2005

Table I 2006 Processing Payments and Fees Effective January 1, 2006 Glass, Bimetal and Plastic									
		Plastic							
	Glass	PET	HDPE	Vinyl	LDPE	PP	PS	Other	Bimetal
Cost of Recycling per Ton with Reasonable Financial Return	$86.93	$520.10	$708.20	$1,669.72	$1,992.10	$853.37	$3,217.53	$1,333.13	$639.99
Scrap Value per Ton	$3.25	$293.71	$305.55	$10.83	$480.52	$166.60	$132.02	$59.16	$10.55
Processing Payments to Recyclers									
Processing Payment Per Ton Redeemed	$83.68	$226.39	$402.65	$1,658.89	$1,511.58	$686.77	$3,085.51	$1,273.97	$629.44
Processing Payment Per Pound Redeemed	**$0.04184**	**$0.11320**	**$0.20133**	**$0.82945**	**$0.75579**	**$0.34339**	**$1.54276**	**$0.63699**	**$0.31472**
Containers Per Pound	1.83	12.8	5.6	9.8	41.6	9.0	69.8	11.3	8.0
Processing Payment Per Container	$0.02286	$0.00884	$0.03595	$0.08464	$0.01817	$0.03815	$0.02210	$0.05637	$0.03934
Processing Fees to be Paid by Beverage Manufacturers									
Manufacturers' Percentage of Processing Payment	13%	18%	14%	65%	65%	65%	65%	65%	65%
Processing Fee Pursuant to Section 14575(f)	$0.00297	$0.00159	$0.00503	$0.05501	$0.01181	$0.02480	$0.01437	$0.03664	$0.02557
Section 14575(k) Processing Fee Reduction	$0.00068	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Processing Fee to be Paid by Beverage Manufacturers	**$0.00229**	**$0.00159**	**$0.00503**	**$0.05501**	**$0.01181**	**$0.02480**	**$0.01437**	**$0.03664**	**$0.02557**

B. Scrap Value Trends

The DOR is required to calculate the average scrap values paid to recyclers for the twelve months between October 1, and September 30, directly preceding the year for which processing payments and fees are calculated. For example, for the January 1, 2006 processing payments and fees, the average scrap value used for the calculation covers the time period from October 1, 2004, to September 30, 2005.

Table IV-4, on the following page, shows the DOR calculated scrap values per ton for this processing fee calculation as compared to scrap values used in the prior year. With the exception of glass and PVC #3, there were significant increases and decreases in scrap values between 2004 and 2005. Aluminum, PET #1, and HDPE #2 scrap prices sustained the upward trend that began in 2003. Scrap values for bi-metal and plastics #3 to #7 were highly volatile. This volatility is primarily a result of the extremely small volumes, and limited number of transactions, that make up the scrap value survey sample for these minority materials.

Table IV-4
Comparison of Statewide Average Scrap Values Per Ton

Material	October 2003 to September 2004, for January 1, 2005 Processing Fee	October 2004 to September 2005, for January 1, 2006 Processing Fee
Aluminum	$1,164.77	$1,286.34
Glass	3.25	3.25
Bi-Metal	(2.56)	10.55
PET #1	224.93	293.71
HDPE #2	194.11	305.55
PVC #3	13.78	10.83
LDPE #4	0.10	480.52
PP #5	3.19	166.60
PS #6	105.03	132.02
Other #7	(36.98)	59.16