

Summary of Analytical Results for Bisphenol A

From the Analysis of Cash Register Receipt Paper

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Abstract

This report compiles and discusses the results of analysis of ninety-four (94) samples of cash register receipts collected from twelve (12) grocery store chains and analyzed for bisphenol A (BPA). The samples were collected by two environmental consulting firms and were analyzed by one of two analytical laboratories. Samples were collected from eighty-two (82) stores located in sixty-six (66) cities and seventeen (17) states. Of the ninety-four (94) samples that were analyzed, BPA was found to be present above the sample reporting limits in twenty-seven (27) (28.7%) of the samples.

Introduction

This report summarizes the results of analysis of ninety-four (94) samples of grocery store cash register receipts collected from eighty-two (82) store locations in sixty-six (66) cities during the period from September 26, 2013 thru February 6, 2014. All samples were analyzed only for presence and concentration of bisphenol A (BPA). Samples were collected by two companies, Cirrus Associates, LLC Richardson, Texas and Conestoga-Rovers & Associates, Inc. Houston, Texas and sent, under industry standard Chain of Custody control, for laboratory analysis by either EMSL Analytical, Inc. (EMSL) Cinnaminson, NJ or ALS Environmental, (ALS) Kelso, WA. The number and distribution of samples by source category is summarized in Table 1 below.

Table 1 – Sample Source Distribution

Number of Grocery Chains	Number of Stores	Number of Cities	Number of States	Number of Samples
12	82	66	17	94

The number and distribution of samples by population of the town from which the samples were collected are summarized in Table 2 below.

Table 2 – Sample Distribution by Source Population

City Population	< 10,000	10,000 – 100,000	100,000-1,000,000	>1,000,000
Number of Stores	8	47	18	9
Number of Samples	13	52	19	10
Number of Replicates ₁	4	2	0	0
Number of Duplicates ₁	1	3	1	1
Per Cent of Samples	13.8%	55.3%	20.2%	10.6%

¹ As used in this document, **Replicate Samples** are samples collected from the same store by different samplers on different dates. As a results, samples collected at a store may not be taken from the same roll of receipt tape or from the same lot of receipt tape. By comparison, **Duplicate Samples** are collected at the same time by the same sampler, in this situation the samples are likely collected from the same roll of receipt tape. Duplicate and replicate samples are collected for quality control purposes to evaluate sources of error or variance in the analytical data.

The number and distribution of samples by grocery chain are summarized in Table 3 below.

Table 3 – Sample Distribution by Grocery Chain

Grocery Chain	Number of States	Number of Stores	Number of Samples	Percent of Samples	Number of Duplicates	Number of Replicates
Ahold	1	5	6	6.4%	1	0
Albertson's	1	1	1	1.1%	0	0
Central Market	1	3	3	3.2%	0	0
Giant	1	2	3	3.2%	1	0
HEB	1	7	8	8.5%	1	0
Kroger	4	14	16	17.0%	1	1
Martin's	1	2	2	2.1%	0	0
Ralph's	1	6	7	7.4%	1	0
Randall's	1	4	4	4.3%	0	0
Safeway	5	16	16	17.0%	0	0
Super S&S	3	6	6	6.4%	0	0
Winn Dixie	3	15	21	22.3%	1	5
Unknown	1	1	1	1.1%	0	0

Summary of Analytical Results

EMSL performed the analysis of a total of 44 samples including six duplicate and six replicate samples by USEPA Method 3540C/8270C. ALS performed the analysis of a total of 50 samples including six replicate samples by USEPA Method 3541 and GC/MS. The reports for seven of the samples analyzed by EMSL were flagged to indicate the results for the acid surrogates fell below the control limits and that amount of sample submitted was insufficient for re-extraction to verify the accuracy of the reported results. Ten of the samples analyzed by ALS were flagged to indicate the results for the surrogates were outside the control limits. The laboratory reported that “The quality of the sample data was not significantly affected”.

Of the ninety-four (94) samples, sixty-seven (67) (71.3%) were reported to have concentrations of BPA of less than the sample reporting limits².

Results by Grocery Chain

Analytical results for all samples were sorted by grocery chain and the states from which the samples were collected. Sample results were tabulated by reported concentration and are summarized in Table 4 below. As can be seen from an examination of Table 4, five (5) grocery chains had stores producing samples with reported BPA concentrations above the sample reporting limits. All of the samples with reported BPA concentrations above 1,000 mg/kg are associated with ten (10) Winn Dixie stores located

² **Sample Reporting Limit** means the lowest concentration of a compound (bisphenol A) that can be reported with a given level of confidence and reflects the impacts associated with the sample matrix (paper), dilution and analytical technique. Analytical results reported as “less than the sample reporting limit” means that the laboratory can report with a high level of confidence that bisphenol A is not present in the sample at concentrations above the sample reporting limit.

in Alabama, Florida and Georgia. Samples from the remaining five (5) Winn Dixie stores had reported BPA concentrations of 10 mg/kg or less. BPA was not detected above the sample reporting limit for the remaining seven (7) identified grocery chains and one (1) unidentified grocery chain.

Table 4 - Analytical Results by Grocery Chain and State

Store Name and Number	BPA Present Yes/No ³	City	State	Results mg/kg	Reporting Limit mg/kg
Ahold #0544	Yes	Ronkonkoma	NY	0.60	0.40
Ahold #0590	Yes	Riverhead	NY	5.8	2.3
Ahold #0594	Yes	Islandia	NY	1.0	0.39
<i>Ahold #2505³</i>	<i>No</i>	<i>Shirley</i>	<i>NY</i>	<i>ND⁴</i>	2.3
<i>Ahold #2505</i>	<i>No</i>	<i>Shirley</i>	<i>NY</i>	<i>ND</i>	1.8
Ahold #2551	No	Hampton Bays	NY	ND	2.3
Albertsons #4105	No	Dallas	TX	ND	0.39
Central Market #491	No	Houston	TX	ND	1.6
Central Market #546	No	Plano	TX	ND	3.5
Central Market #653	No	Dallas	TX	ND	2.1
<i>Giant #0777</i>	<i>No</i>	<i>Alexandria</i>	<i>VA</i>	<i>ND</i>	2.0
<i>Giant #0777</i>	<i>No</i>	<i>Alexandria</i>	<i>VA</i>	<i>ND</i>	2.0
Giant #744	No	Clifton	VA	ND	1.4
HEB #107	No	Ennis	TX	ND	1.50
HEB #16	No	Burleson	TX	ND	1.7
HEB #238	No	Corsicana	TX	ND	2.5
HEB #26	No	Houston	TX	ND	11.0
HEB #416	No	Waxahachie	TX	ND	2.1
<i>HEB #615</i>	<i>No</i>	<i>Katy</i>	<i>TX</i>	<i>ND</i>	1.4
<i>HEB #615</i>	<i>No</i>	<i>Katy</i>	<i>TX</i>	<i>ND</i>	1.5
HEB #631 (revised)	No	Granbury	TX	ND	4.9
Kroger #305	Yes	Raleigh	NC	3.0	2.5
Kroger #331	No	Durham	NC	ND	2.9
Kroger #352	No	Lawrenceville	GA	ND	2.4
Kroger #357	No	Apex	NC	ND	1.4
<i>Kroger #367</i>	<i>Yes</i>	<i>Carrollton</i>	<i>GA</i>	<i>3.5</i>	<i>0.99</i>
<i>Kroger #367</i>	<i>Yes</i>	<i>Carrollton</i>	<i>GA</i>	<i>2.8</i>	<i>1.3</i>
<i>Kroger #367</i>	<i>No</i>	<i>Carrollton</i>	<i>GA</i>	<i>ND</i>	0.39
Kroger #371	No	Fuquay-Varina	NC	ND	1.4
Kroger #374	No	Lawrenceville	GA	ND	0.39
Kroger #434	No	Suwanee	GA	ND	0.36
Kroger #438	No	Libum	GA	ND	0.33

³ **Notes:** **Italic** indicates replicate and duplicate samples

Bold indicates samples that had bisphenol A concentrations above the sample reporting limit

⁴ In Table 4 "**ND**" means that bisphenol A was not detected in that sample at concentrations above the sample reporting limits contained in the column labeled Reporting Limits.

Store Name and Number	BPA Present Yes/No ³	City	State	Results mg/kg	Reporting Limit mg/kg
Kroger #480	No	Grayson	GA	ND	1.9
Kroger #499	Yes	Bluffton	SC	1.5	1.1
Kroger #636	No	Duluth	GA	ND	0.37
Kroger #906	No	Indianapolis	IN	ND	0.38
Kroger #962	No	Indianapolis	IN	ND	0.37
Martins #6304	No	Harrisonburg	VA	ND	1.1
Martins #6402	Yes	Williamsburg	VA	2.0	1.5
Ralph's - Kroger #139	No	Tustin	CA	ND	0.33
Ralph's - Kroger #299	No	Irvine	CA	ND	0.36
<i>Ralph's #198</i>	<i>No</i>	<i>Los Angeles</i>	<i>CA</i>	<i>ND</i>	<i>2.5</i>
<i>Ralph's #198</i>	<i>No</i>	<i>Los Angeles</i>	<i>CA</i>	<i>ND</i>	<i>1.3</i>
Ralph's #213	No	West Hills	CA	ND	1.3
Ralph's #219	No	Encino	CA	ND	0.8
Ralph's #284	No	Culver City	CA	ND	0.97
Randall's - Safeway #1247	No	Houston	TX	ND	0.37
Randall's - Safeway #2961	No	Houston	TX	ND	0.38
Randall's - Safeway #3067	No	Houston	TX	ND	0.32
Randall's -Safeway #2672	No	Houston	TX	ND	0.40
Safeway #0041	No	Lakewood	CO	ND	0.36
Safeway #0322	No	Golden	CO	ND	0.37
Safeway #0497	No	Shoreline	WA	ND	0.39
Safeway #0526	No	Kirkland	WA	ND	0.40
Safeway #0535	No	Bothell	WA	ND	0.38
Safeway #103	No	Waldorf	MD	ND	0.39
Safeway #105	Yes	Waldorf	MD	3.0	2.5
Safeway #1107	No	Arvada	CO	ND	0.33
Safeway #1514	No	Mill Creek	WA	ND	0.37
Safeway #1521	No	Oro Valley	AZ	ND	0.32
Safeway #1599	No	Littleton	CO	ND	0.40
Safeway #1847	No	Alexandria	VA	ND	2.5
Safeway #1983	No	Tucson	AZ	ND	0.35
Safeway #2060	No	Tucson	AZ	ND	0.31
Safeway #2342	No	Lakewood	CO	ND	0.35
Safeway #2734	No	Kirkland	WA	ND	0.34
Stop & Shop #2800	No	Somerset	NJ	ND	0.40
Super Stop & Shop #0455	No	Winchester	MA	ND	0.38
Super Stop & Shop #0684	No	Southington	CT	ND	0.38
Super Stop & Shop #0803	No	Edison	NJ	ND	0.38
Super Stop & Shop #096	No	Woburn	MA	ND	0.40
Super Stop & Shop #2809	No	East Brunswick	NJ	ND	0.39
Winn Dixie #0022	Yes	Albany	GA	1.3	1.1
Winn Dixie #0032	Yes	Lake Park	GA	3,500	780

Store Name and Number	BPA Present Yes/No³	City	State	Results mg/kg	Reporting Limit mg/kg
Winn Dixie #0032	Yes	Lake Park	GA	10,000	450
Winn Dixie #0110	Yes	Leesburg	GA	5,200	700
Winn Dixie #0110	Yes	Leesburg	GA	7,000	300
Winn Dixie #0140	Yes	Valdosta	GA	7,600	790
Winn Dixie #0140	Yes	Valdosta	GA	10,000	500
Winn Dixie #0545	Yes	Americus	GA	10	1.5
Winn Dixie #0564	No	Mobile	AL	ND	0.32
Winn Dixie #0572	No	Mobile	AL	ND	0.30
Winn Dixie #0590	No	Mobile	AL	ND	0.33
Winn Dixie #0713	Yes	Dundee	FL	8,100	270
Winn Dixie #0713	Yes	Dundee	FL	8,200	300
Winn Dixie #0713	Yes	Dundee	FL	4,300	590
Winn Dixie #405	Yes	Birmingham	AL	5,200	780
Winn Dixie #461	Yes	Trussville	AL	3,200	730
Winn Dixie #550	Yes	Hueytown	AL	4,100	800
Winn Dixie #595	Yes	Bessemer	AL	8,300	740
Winn Dixie #609	Yes	Avon Park	FL	3.5	1.5
Winn Dixie #609	Yes	Avon Park	FL	4,500	710
Winn-Dixie #517	Yes	Vestavia Hills	AL	4,600	700
Not Identified	No	Durham	NC	ND	0.38

Steve Thompson

Summary of Qualifications

Prior to founding ENSOURCE CORPORATION in 1992, Mr. Thompson served as Chief Operating Officer and Director of Waste Processor Industries (WPI, Inc.), an environmental services company specializing in environmental remediation, hazardous and non-hazardous waste transportation and PCB services. His experience in the environmental services field began in 1973 as a chemist and has included both staff and operating responsibilities. During his 15 year career with Browning-Ferris Industries, Inc., his responsibilities ranged from Vice President, Operations for the company's chemical waste activities to Divisional Vice President Environmental Controls responsible for assessment, permitting, compliance and remediation of the company's facilities, including environmental assessments of potential acquisition candidates.

Professional Experience

1973 – 1975 Chemist – Browning Ferris Industries, Inc.

1975 – 1977 Senior Chemist – Browning Ferris Industries, Inc.

1979 – 1982 Manager Environmental Controls – Browning Ferris Industries, Inc.

1982 – 1986 Divisional Vice President Environmental Controls - – Browning Ferris Industries, Inc.

1986 – 1989 Vice President Operations – CECOS International a subsidiary of Browning Ferris Industries, Inc.

1989 – 1992 Chief Operating Officer – WPI Inc.

1992 – Current President – ENSOURCE CORPORATION

Education and Work Related Training

- B.S. Chemistry, minor in Mathematics, 1973 University of Houston
- M.B.A. Finance, 1981 University of Houston, Bauer College of Business.
- Spatial Analysis of Environmental Data, 2009 University of Florida, Gainesville
- Visual Sample Plan Software Training, 2006 updated 2009 Ohio University
- Spatial Analysis and Decision Assistance Software Training, 2004 updated 2009 University of Tennessee
- Sampling for Defensible Environmental Decisions – 2003 Colorado School of Mines
- 40-Hour HAZWOPER
- Annual 8-Hour HAZWOPER Refresher Course
- 8-Hour N.O.R.M. Course
- Confined Space Entry Training
- LPS – Behavior Based Safety System Training
- OSHA Competent Person Training for Excavation
- OSHA Hydrogen Sulfide Safety Training