



Measuring Marketing Impacts
ENERGY STAR CFL Study

A project of the U.S. Department of Energy
ENERGY STAR Program

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¹ D&R International conducted this study under contract to the U.S. Department of Energy. The authors may be reached at areeves@drintl.com, sbickel@drintl.com, and bmcnary@drintl.com.

Executive Summary

Compact fluorescent lamps (CFLs) are often an impulse buy, and consumers make many lighting purchase decisions in the store. As a result, retailers, manufacturers, and energy efficiency program sponsors (EEPS) that want to increase CFL sales invest in signage, displays, and other materials to influence shoppers at the point-of-purchase (POP). However, little is known about the effectiveness of these in-store efforts; in other words, do they actually lead shoppers to purchase CFLs? Without hard evidence that POP materials can and do motivate shoppers to buy CFLs, EEPS have relied mainly on cash incentives to change consumer purchasing behavior and have found it difficult to justify investments in education. This study was designed to determine whether simple but compelling point-of-purchase signs could achieve a measurable increase in CFL sales.

The two product benefits thought to be most compelling to consumers are long lifetime and energy-cost savings. D&R International, on behalf of DOE, worked with interested EEPS and retailers to develop and execute an in-store experiment to determine whether messages communicating these benefits would lead to increased sales and whether one message is more effective than the other. We created three sign designs for the experiment: one to convey the long life message, a second to convey the energy-cost savings message, and a third to convey the two messages in combination. Signage was carefully crafted to be vivid, attention grabbing, concrete, personal, simple, and specific—all factors demonstrated by others in previous experiments to improve the effectiveness of communications.^{2,3,4}

We selected 145 retail stores in seven regions of the United States to participate in the study. Signage was installed in the CFL aisle of 109 “treatment” stores, and the remaining 36 stores served as a control group. The signage remained in place for at least two weeks during the summer of 2006. We collected CFL unit sales data for each store in the study, and then compared sales during the test period to sales during the same period a year earlier. After eliminating stores with incomplete data, a total of 119 stores were included in the final analysis.

Of the three signage designs, only the one with long-life messaging was clearly linked to increased sales. When background differences in store environment were controlled for, the long-life signage was associated with a statistically significant 15-percentage point greater increase in sales compared to stores with no signage. Neither savings nor combination signage was associated with a statistically significant difference in sales. These data, combined with corroborating results from retailer focus groups, suggest that use of a long-life message in POP materials could help increase CFL sales.⁵

² M. Costanzo, D. Archer, E. Aronsen, and T. Pettigrew. (1986). Energy Conservation Behavior: The Difficult Path From Information to Action. *American Psychologist*, 41(5).

³ M.H. Gonzales, E. Aronson, and M. Costanzo. (1988). Increasing the effectiveness of energy auditors: A field experiment. *Journal of Applied Social Psychology*, 18, 1049-1066.

⁴ D. McKenzie-Mohr and W. Smith. (1999) *Fostering Sustainable Behavior*. New Society Publishers.

⁵ Personal communications with two leading CFL manufacturers.

Introduction

The objective of the study was to determine whether compelling signs incorporating specific POP messages could achieve a measurable increase in CFL sales. This research was conducted in order to better understand how to affect in-store sales of ENERGY STAR qualified CFLs. Market research has shown that CFLs are typically an impulse purchase and that 65% of all lighting purchase decisions are made in store.⁶

Methodology

The methodology was conceptually simple:

1. Select a small set of consumer messages to test.
2. Design signage to convey those messages as effectively as possible at point-of-purchase.
3. Produce and install the signage in a sample of retail stores.
4. Gather sales data from those stores and from a control group of stores.
5. Compare CFL sales when signage was present with CFL sales when it was not.

The remainder of this section explains the methodology in more detail.

Message selection and signage design

D&R reviewed publicly available market research on attitudes, sales, and marketing of CFLs and consulted with industry and energy efficiency program sponsor experts to identify the two sales messages thought to be most effective. These were long life and energy cost savings. In the past, long life had scored highest in focus group tests, but more recent tests in the U.S. and Canada have found savings scoring as well or better. We, therefore, decided to test both long life and energy cost savings as well as a combined message to test for synergies between the two “pure” messages.

Signage that conveyed these messages was designed to maximize impact on sales, subject to the constraints imposed by the sales environment. Insights from social psychology—the study of factors that influence human behavior—were applied to signage design. Images and messaging were crafted to conform to tested principles of effective communication and influence. Signage and messaging was designed to be vivid and attention grabbing, concrete, personal, simple and specific—factors experimentally demonstrated to improve the effectiveness of communications. For example, one test sign showed a homeowner with a shocked expression viewing her utility bill accompanied by a caption that read “Shocked by your energy costs? Buy five [picture of a CFL bulb] and Save \$150!” To catch shoppers’ attention, the signs were produced at large size or in large number and were mounted as aisle violators, which protrude into the aisle perpendicular to the plane of the shelving. Each sign bore the same image on both sides.

⁶ Point-of-Purchase Advertising Institute cited in Regional Economic Research, Inc. (2000). Residential Energy Efficient Lighting Consumer Research (Report #00-051). Northwest Energy Efficiency Alliance.

Minor customizations were made to the three designs pictured below for some retailers, and not all retailers displayed every sign type.

Energy Cost Savings



Long Life



Combination



Signage installation

Signs were mounted in the light bulbs aisle of 109 retail stores; 40 received signs with the long-life message, 28 received signs with the money-saving message, and the remaining 41 received signs that combined the long-life message with the money-saving message. A fourth group of 36 stores received no signs and served as controls (Table 1).

Research shows that prompts can be extremely effective at influencing behavior, but that their influence is directly proportional to their proximity in space and time to the desired

action. To ensure that the signs would serve as an effective prompt, they were posted immediately adjacent to CFLs in each store’s light bulb aisle.

Sales data analysis

We collected and analyzed sales data from each store in the sample. We looked at the year-on-year percent-change in CFL bulb sales—a comparison between the number of CFLs sold when experimental signage was present and the number sold in the same period a year earlier, when the experimental signage was absent. To control for time effects, we did the same comparison in a control group of stores that did not receive signage. Note that of the 109 stores in which we installed signage, 24 had to be excluded from the analysis due to incomplete data.

Table 1. Number of Stores in Sample

Group	Total in Field Study	Excluded from Analysis*	Included in Analysis
Control – No Sign	36	2	34
Treatment – Any Sign	109	24	85
Long Life	40	9	31
Savings	28	6	22
Combination	41	9	32
Total	145	26	119

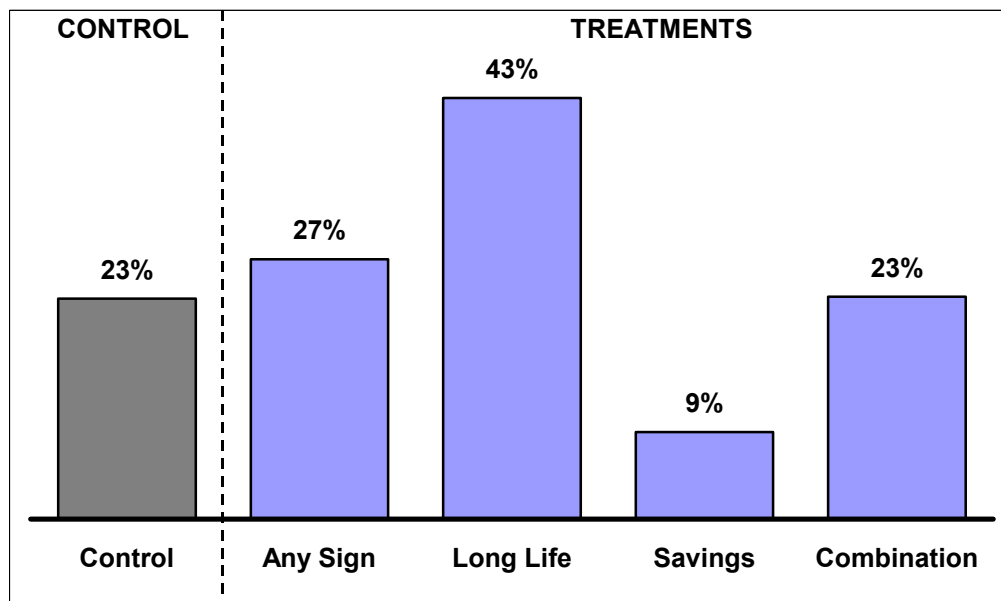
* Three stores were discarded and excluded from the analysis because they were found to be offering steeply discounted CFL bulbs at the time of this study. An additional 23 stores for which we lacked sufficient data were also excluded, for a total of 26.

Results

We compared CFL unit sales when experimental signage was in place with sales during the same period one year earlier. In those stores that contained experimental signage, average unit sales increased between 9% and 43%, compared to 23% in the control group (Figure 1). Of the three sign types (treatments), only the long-life message was associated with an increase in sales relative to the control group. In the subset of stores that contained long-life signs, sales increased 43%, on average, compared to 23% in the control group, a difference of 20 percentage points. This difference was statistically significant at the 10% level.

Sales increased 9% and 23%, on average, in those stores that contained savings signs and combination signs, respectively. Neither group outperformed the control group. Note that the preceding results do not control for any differences between stores other than the presence and type of experimental signage in each.

Figure 1. Percent Change in CFL Unit Sales: Treatment Period versus One Year Earlier



We used linear regression techniques to control for other differences between stores, including store type, CFL sales volume, and geographic region. The regression models we specified explained roughly half of the variation in the dependent variable (percent change in CFL sales). One model predicted a modestly higher percent change in sales in stores containing experimental signage when compared with no signage. However the coefficient was not statistically significant. Another model was used to test the strength of the relationship between each type of sign (message) and sales. In this model, long-life signage was associated with a 15-percentage point greater increase in sales when compared with no signage. This difference was statistically significant at the 10% level. The savings and combination messages were weakly related to sales.

Discussion

The data offer some evidence in support of the hypothesis that compelling point-of-purchase messages can contribute to measurable increases in sales of CFLs. The particular sign we tested that used only the long-life message increased CFL sales when used at point of purchase.⁷ In light of corroborating focus group data, the results suggest that using a long-life message in POP materials will help spur CFL sales.⁸ EEPS, retailers, and manufacturers are encouraged to use the long-life message.

We are unable to make a stronger conclusion regarding the relative impacts of the other messages because this study had a few important limitations. First was the small sample size. Ordinary least squares regression models with multiple controls are typically used in cases where there are hundreds, if not thousands, of observations. Due to budget and time constraints, we were able to include only a relatively small number of stores in this study. Second was the presence of uncontrolled factors. There were undoubtedly many unobserved differences between stores that were related to CFL sales that could not be accounted for in the analysis. In addition, a number of changes affecting the stocking and display of CFLs took place in some of the stores in the sample during the time of the study; these changes may also have affected CFL sales. Third, while overall design look and feel was consistent among the three test designs, each sign had unique design characteristics and differed with respect to image, text placement and font size. These differences are likely to have contributed in some degree to the overall impact of the sign.

Our approach could usefully be replicated elsewhere and extended to address some of the limitations of this study. Future research should test additional signage designs and message variations. Researchers must be cognizant of differences in sales environments, as a POP strategy that works well in one setting may not work well in another.

⁷ This sign design is available for customization and general use; contact the authors for more information.

⁸ Personal communications with two leading CFL manufacturers.

Appendix A: Detailed Methodology

Sample design

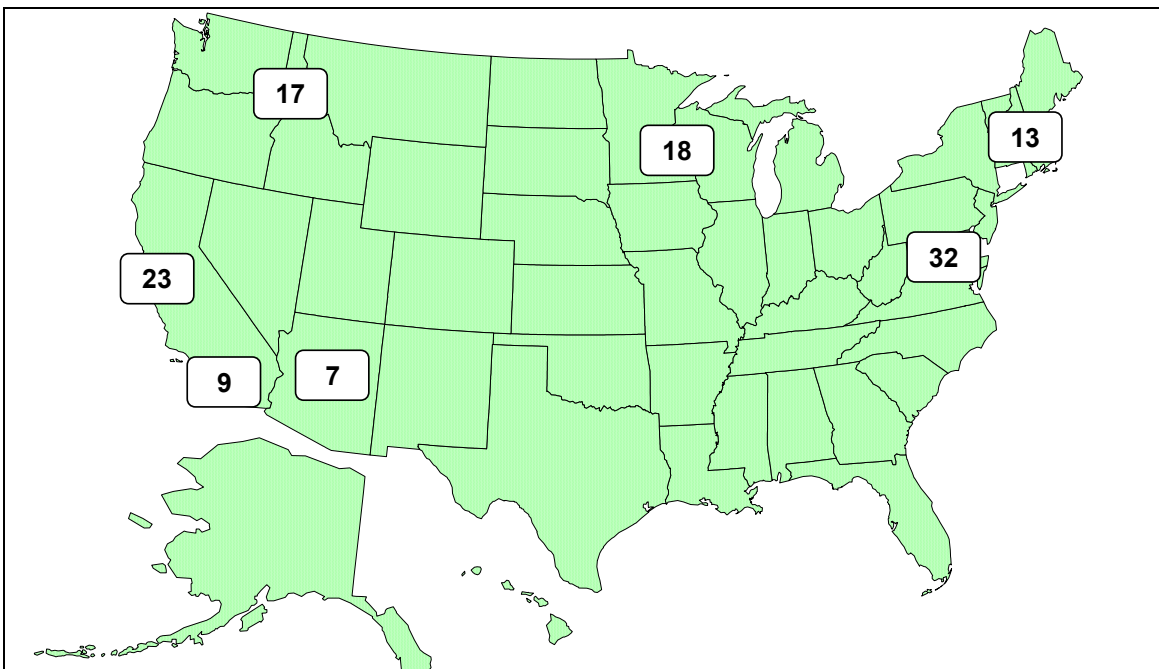
The stores included in this study were drawn from the population of stores in participating retailers' chains that were located in areas of the country where we were able to recruit field staff to support the project. Areas that lacked field staff support could not be included in the study. Study areas were as follows:

- Northwest (ID, MT, OR, WA)
- San Francisco Metro (CA)
- San Diego Metro (CA)
- Phoenix Metro (AZ)
- Minneapolis & Madison Metros (MN, WI)
- Washington Metro (MD, DC, VA)
- Massachusetts & Vermont

Within each of the seven study areas, participating stores were randomly assigned to one of the treatment or control groups.

The final analysis included data from a total of 119 stores: 85 treatment stores, which received signage, and 34 control stores, which did not. The 119 stores were located in twelve states and the District of Columbia and were distributed as shown in Figure 2. See Appendix B for a comparison of the seven study areas with the U.S. as a whole.

Figure 2. Geographic distribution of the 119 stores included in the final analysis



Timing

Field staff conducted store visits in three stages. During the first stage, which began on June 15, 2006 and ended on June 23rd, field staff visited most of the stores included in the study to establish the baseline and allow us to assess drivers of future sales. In the second stage, which ran from July 6th to July 24th, field staff made their second store visits, reassessed the store conditions, and installed signage in all but the control stores. In the third and final stage, which ran from August 7th to 13th, field staff returned to the stores to reassess store conditions once again and remove the experimental signage.

Types of data collected

We collected sales data from the participating retailers to calculate percent change in CFL bulb sales. We also collected data from direct observations in each store that we used to control for variations in store environment that might plausibly explain some of the observed variation in CFL sales, both between stores and within a single store over time. All stores included in this study were assessed when signage was installed and again when signage was removed. Most also received a preliminary assessment a few weeks before signage was installed. Field staff used the survey instruments shown in Appendix C to record, for each store, a number of characteristics deemed important to the study, including the amount of shelf space devoted to CFLs, the presence or absence of CFLs at the registers, and the presence, size, and content of CFL-related signage and other POP materials. We also used the completed store assessment surveys to verify, for each store, the number and type of signs and dates signage was present.

Appendix B: Demographics

The 119 stores analyzed in this study were located in or near the seven geographic areas of the United States listed in Table 2. For each area, the table indicates the number of stores and share of total stores, population, median household income, and residential price of electricity. These data are included here to inform attempts to generalize from this study's findings to other geographic areas of interest. Keep in mind, however, that income and electricity price are just two of the many factors that could be related to signage effectiveness.

Table 2. Key characteristics of geographic areas in which stores were located

Geographic Area	Number of Stores in Study	Share of All Study Areas (%)	Population (millions)	Median Income (\$000/yr)	Price of Electricity (¢/kWh)
Massachusetts & Vermont	13	11%	7.1	57	13.4
Northwest (ID, MT, OR, WA)	17	14%	12.3	39-49	6.8
Phoenix Metro	7	6%	3.9	48	8.7
San Diego Metro	9	8%	2.9	56	14.8
San Francisco Metro	23	19%	4.2	65	15.0
Minneapolis & Madison Metros	18	15%	3.7	53-60	9.1
Washington Metro	32	27%	5.2	75	8.7
All Study Areas	119	100%	39.2	--	10.1
United States as a whole	--	--	288.4	46	9.5

Notes:

- The price of electricity given for 'All Study Areas' is the population-weighted average price.
- A small number of stores included in 'Minneapolis & Madison Metros' are located in Wisconsin but outside of the Madison metro area.
- Income figure given for 'Minneapolis & Madison Metros' is for Minneapolis metro area only.
- Income figure given for 'Massachusetts & Vermont' is for Massachusetts only.

Sources:

- Population estimates for states from Table 1: Annual Estimates of the Population for the United States, Regions, and States and for Puerto Rico: April 1, 2000 to July 1, 2006 (NST-EST2006-01), Population Division, U.S. Census Bureau, December 22, 2006.
- Population estimates for metropolitan areas from Table 1: Annual Estimates of the Population of Metropolitan and Micropolitan Statistical Areas: April 1, 2000 to July 1, 2005 (CBSA-EST2005-01), Population Division, U.S. Census Bureau, August 21, 2006.
- Income figures from Table DP-3: Selected Economic Characteristics, 2005 American Community Survey, U.S. Census Bureau.
- Electricity prices from Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report" and from Bureau of Labor Statistics Consumer Expenditure Survey data compiled by Ameren Services, http://www.ameren.com/AboutUs/ADC_AUE_AvgElectPrices.pdf (last accessed February 13, 2007)

Appendix C: Store Assessment Surveys

The three survey instruments, one for each stage, are reproduced on the following pages.



**Measuring Marketing Impacts
Baseline Store Assessment Survey**

Unique Store ID: DR

Store Identification

Chain Name: _____ Store Number: _____
 Street Address: _____
 City: _____ State: _____ Zip: _____

Surveyor: _____
 On behalf of: _____
 Date of Survey: _____ (mm/dd/yy)

Amount of Space Devoted to CFLs

	width (ft.)	height (ft.)	depth (ft.)
Light Bulbs Aisle			
End-Caps			
Light Fixtures Aisle			
Registers/Check-out			
Other			

What % of registers have CFLs at them? _____

Presence of CFL Point-of-Purchase (POP) Materials -- Light Bulbs Aisle ONLY

For each type of POP, first record in column A the total number of pieces, then in columns B through I check off all those themes that are featured.

POP Type*	Number of Pieces	Check off all those themes* featured on each type of POP																		
		A	B	C	D	E	F	G	H	I										
Overhead																				
Headers and Banners																				
<1 ft. in height																				
Aisle violators																				
1-3 ft. in height																				
>3 ft. in height																				
Shelf shouters/talkers																				
Small shelf attachments																				
Tear pads/coupons																				
Wobblers																				
In-aisle																				
End-caps																				

*SEE SEPARATE INSTRUCTIONS FOR DEFINITIONS AND FURTHER GUIDANCE

CONTINUED ON REVERSE

Unique Store ID: DR

Content of Overhead Signage and Aisle Violators -- CFL Themes ONLY

Transcribe the main text (no footnotes) and describe the image depicted (where relevant) on each type of overhead sign and aisle violator.

Approx. Size	Transcription of Text	Description of Image(s)
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		



Store Identification

Unique Store ID: **DR**

**Measuring Marketing Impacts
Baseline Store Assessment Survey for Stage 2**

Chain Name: _____ Store Number: _____
 Street Address: _____
 City: _____ State: _____ Zip: _____

Surveyor: _____
 On behalf of: _____
 Date of Survey: _____ (mm/dd/yy)

Amount of Space Devoted to CFLs

	Change Since First Baseline Survey?	width (ft.)	height (ft.)	depth (ft.)	Total Area or Volume (sum if separate sections or blocks)
Light Bulbs Aisle	Yes / No / N/A			--	SQUARE FEET
End-Caps	Yes / No / N/A				CUBIC FEET
Light Fixtures Aisle	Yes / No / N/A			--	SQUARE FEET
Registers/Check-out	Yes / No / N/A			--	SQUARE FEET
Other	Yes / No / N/A				SQUARE FEET or CUBIC FEET (circle one)

Describe "Other" and give location (may include stacks of CFLs in aisles):

Percent (%) of registers with CFLs at them _____ %

Presence of CFL Point-of-Purchase (P.O.P.) Materials -- Light Bulbs Aisle ONLY

For each type of P.O.P., first record in column A the total number of pieces, then in columns B through I check off all those themes that are featured.

Check off all those themes* featured on each type of POP

POP Type*	Number of Pieces	Check off all those themes* featured on each type of POP								
		A	B	C	D	E	F	G	H	I
		Change Since First Baseline Survey?	rebate or discount	\$ savings - single bulb	\$ savings - multiple bulbs	energy savings	long life	convenience	ENERGY STAR logo	other
Overhead		Yes / No / N/A								
Headers and Banners		Yes / No / N/A								
<1 ft. in height		Yes / No / N/A								
1-3 ft. in height		Yes / No / N/A								
>3 ft. in height		Yes / No / N/A								
Shelf shouters/talkers		Yes / No / N/A								
Tear pads/coupons		Yes / No / N/A								
Wobblers		Yes / No / N/A								
In-aisle		Yes / No / N/A								
End-caps		Yes / No / N/A								

*SEE SEPARATE INSTRUCTIONS FOR DEFINITIONS AND FURTHER GUIDANCE
 CONTINUED ON REVERSE

WRITE "NO CHANGE" WHERE P.O.P. HAS NOT CHANGED SINCE FIRST BASELINE SURVEY.

Unique Store ID: DR

Content of Overhead Signage and Aisle Violators --CFL Themes ONLY

Transcribe the main text (no footnotes) and describe the image depicted (where relevant) on each type of overhead sign and aisle violator.

Approx. Size	Transcription of Text	Description of Image(s)
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		

Signage Installation Verification

I installed 1 large / 4 small sign(s) featuring a long life / savings / combination message in the light bulbs aisle of this store.
(circle one) (circle one) (circle one)



Store Identification

Chain Name: _____ Store Number: _____
 Street Address: _____
 City: _____ State: _____ Zip: _____

Unique Store ID: **DR**

**Measuring Marketing Impacts
 Store Assessment Survey for Stage 3**

Surveyor: _____
 On behalf of: _____
 Date of Survey: _____ (mm/dd/yy)
 Date of Last Visit: _____ (mm/dd/yy)

Amount of Space Devoted to CFLs	Change Since Last Visit?	width (ft.)	height (ft.)	depth (ft.)	Total Area or Volume (sum if separate sections or blocks)
Light Bulbs Aisle	Yes / No			--	SQUARE FEET
End-Caps	Yes / No				CUBIC FEET
Light Fixtures Aisle	Yes / No			--	SQUARE FEET
Registers/Check-out	Yes / No			--	SQUARE FEET
Other	Yes / No				SQUARE FEET or CUBIC FEET (circle one)

Describe "Other" and give location (may include stacks of CFLs in aisles):

Percent (%) of registers with CFLs at them	Yes / No	%
--	----------	---

Presence of CFL Point-of-Purchase (P.O.P.) Materials --Light Bulbs Aisle ONLY

For each type of P.O.P., first record in column A the total number of pieces, then in columns B through I check off all those themes that are featured.

Check off all those themes* featured on each type of POP

POP Type*	Number of Pieces	Change Since Last Visit?	rebate or discount	\$ savings - single bulb	\$ savings - multiple bulbs	energy savings	long life	convenience	ENERGY STAR logo	other
Overhead		Yes / No								
Headers and Banners		Yes / No								
<1 ft. in height		Yes / No								
1-3 ft. in height		Yes / No								
>3 ft. in height		Yes / No								
Shelf shouters/talkers		Yes / No								
Small shelf attachments		Yes / No								
Tear pads/coupons		Yes / No								
Wobblers		Yes / No								
In-aisle		Yes / No								
Fixtures and displays		Yes / No								
End-caps		Yes / No								

*SEE SEPARATE SURVEY GUIDELINES FOR DEFINITIONS AND FURTHER GUIDANCE

CONTINUED ON REVERSE

WRITE "NO CHANGE" WHERE P.O.P. HAS NOT CHANGED SINCE LAST VISIT.

Unique Store ID: DR

Content of Overhead Signage and Aisle Violators --CFL Themes ONLY

Transcribe the main text (no footnotes) and describe the image depicted (where relevant) on each type of overhead sign and aisle violator.

Approx. Size	Transcription of Text	Description of Image(s)
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		
CIRCLE ONE Overhead or Aisle Violator(s)		

Experimental Signage Verification

Long life / Savings / Combination / No Sign (circle one) was installed in this store in Stage 2.

Of the ___ (#) signs installed in Stage 2, ___ (#) are still in place. Signage no longer here was removed on or around _____ (date) because _____. [Please ask store manager.]