

IMPACT OF TRANSPORTATION TECHNOLOGY AND OPERATION BASED EMISSION REDUCTION STRATEGIES

Task 8a – Extended Idling

*Prepared for
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*By
Texas Transportation Institute*

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CHAPTER 1: INTRODUCTION

Overview

The purpose of this subtask was to identify major heavy duty truck idling generators and associated idling activities to help develop potential emissions reduction strategies achievable through the reduction of extended idling. This subtask focused on major truck idling generators in Texas, and the occurrence of extended truck idling (defined as idling of more than 15 minutes duration) around the state (1). The findings from the first phase of the task, conducted during Fiscal Year (FY) 2008, were summarized in a task memorandum submitted in August 2008.

This task memorandum details the work performed in FY 2009 as a part of the second phase, which examined idling at retail and industrial locations in further detail.

Fiscal Year 2008 Findings

The following types of locations were identified as potential idling generators and investigated:

- Public rest areas
- Truck stops
- Intermodal facilities – rail and port
- Warehouses/ distribution centers
- Retail facilities
- Industrial facilities
- Border crossings

Some of the key tasks conducted are described below:

- Collect information on the size, number of employees, and vehicle activities of the major generators.
- Perform selected surveys of some key generators to develop an understanding of extended idling activities.
- Develop relationships between the surveyed data and the facility characteristics to estimate extended idling activities for the generator types.

The findings indicated that significant reduction of extended idling could be achieved through reduction of idling at many facilities identified as potential generators. However, due to resource limitations, researchers were able to gather only limited data at retail facilities and industries in Texas. As a result, it was difficult to estimate the overall impact of these two generators on extended idling. Thus, the scope of work for FY 2009 was to study extended idling at retail and industrial facilities in greater detail.

Preliminary Findings from FY 2008 – Retail Locations

Retail trade establishments are classified into twelve major subsectors at the 3 digit level (Table 1) using the North American Industry Classification System (NAICS) (2). They generally include establishments that are involved with selling merchandise or provide services necessary to sell merchandise. The retail trade sector is one of eighteen under the NAICS; each sector is further divided based on the industry. According to the U.S. Census Bureau (3) the retail trade sector comprises establishments engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. There are two types of retailer: store retailers that operate from fixed locations and non store retailers.

Table 1: Retail Trade Classification by Subsector

NAICS Code	Description
44 – 45	NAICS Classification: Retail Trade
441	Motor Vehicles and Parts Dealers
442	Furniture and Home furnishing stores
443	Electronics and appliance stores
444	Building materials, garden equipment and supplies dealers
445	Food and beverage stores
446	Health and personal care stores
447	Gasoline stations
448	Clothing and clothing accessories stores
451	Sporting goods, hobby, book and music stores
452	General merchandise stores
453	Miscellaneous store retailers
454	Non store retailers

Using data obtained from the U.S. Census Bureau (3) the number of retail businesses within Texas with 100 employees or more was estimated (Appendix A). Non store retailers were not included in this listing. Appendix B shows the number of retail facilities within Texas' nonattainment counties/areas.

Three retail businesses were observed as a part of the FY 2008 (4) research effort. They included an HEB grocery store in Bryan, a Lowe's home improvement center in Bryan, and a Super Target – general merchandise/grocery store in Sugarland. The observation was carried out to determine the frequency of deliveries and if the delivery trucks idled while on site. No idling was observed at the HEB location and minimal idling was observed at Target, while some significant idling was observed at Lowe's. The results of the observations are shown in Table 2. Overall, out of a total of 51 observed trucks, 9 (18 percent) idled. But given that only few locations were observed, and that the idling varied significantly, it is not clear if the percentage of idling is representative of retail establishments across Texas.

Table 2: Truck Idling at Retail Facilities

Time and Location	Observed Trucks	Observed Idling Trucks	Percentage of Idling Trucks
H-E-B			
6:00am	6	0	0
7:00am	8	0	0
8:00am	6	0	0
Lowe's			
7:00am	6	3	50
8:00am	6	4	67
9:00am	3	1	33
Super Target			
8:00 am	6	1	17
9:00 am	5	0	0
10:00 am	4	0	0
11:00 am	1	0	0

Preliminary Findings from FY 2008– Industrial Locations

Researchers visited some major industrial facilities in the Houston area and attempts were made to quantify the truck activities at such locations. Unfortunately the operations managers at the majority of those locations were not willing to share any information about the truck activities, and researchers were not allowed to observe activities on their premises for safety and security reasons. However, through discussions with managers at these industrial locations, researchers gained some insight into the nature of truck activity and concluded that trucks were less likely to idle at such locations. This was due to the longer turnover times when compared to trucks at retail locations, which are usually on tighter delivery schedules.

Furthermore, reference was made to a past Texas Transportation Institute (TTI) study (5) conducted for the Texas Commission on Environmental Quality (TCEQ) that studied trucks that often idle for extended periods during loading and offloading at industrial facilities. Trucks were observed at petroleum tank farms and petrochemical industries in the Beaumont/Port Arthur area, but there was no idling allowed on the premises for safety reasons. Industries that produce flammable materials such as chemicals, petroleum and rubber products prohibit idling for safety reasons, while some other industries allowed idling. Overall, idling characteristics were obtained for 22 companies through site visits and telephone interviews. It was found that on average 9 trucks visit these industries daily for every 100 employees at the location. It was also found that while only around 60 percent of the industries interviewed actually allowed idling, the average idling duration in those cases was observed to be about 50 minutes. While the research findings did provide an estimation methodology for NOx emissions generation due to idling at industries, it was concluded that industries were still one of the most uncertain generators of extended idling in Texas. This was largely attributed to the lack of conclusive information and limited access to facilities for observation.

Fiscal Year 2009 Tasks for Retail and Industrial Facilities

The work presented in the remainder of this report is an extension of what was previously conducted and summarized above. The purpose of this task was to identify Texas retail locations

and industrial locations with heavy truck activity to be able to estimate potential emissions reductions achievable through reduced extended idling (i.e., idling of more than fifteen minutes in duration).

The focus of this study was on retail and industrial locations within the nonattainment areas in Texas. The emissions of Oxides of Nitrogen (NO_x) are the most significant in relation to heavy-duty diesel emissions. With ozone nonattainment as the focus for Texas nonattainment areas, NO_x as an Ozone precursor was the focus of this task. According to the Texas Commission on Environmental Quality (6) the three areas in nonattainment for eight-hour ozone standards include the Beaumont-Port Arthur (BPA) area, the Houston-Galveston-Brazoria (HGB) area and the Dallas-Fort Worth (DFW) area (Table 3). Researchers selected the Beaumont and Houston areas for conducting the site surveys. Key tasks were:

- Use information such as facility size, number of employees and location of facility to shortlist locations that may have the potential for extended heavy duty truck idling.
- Develop sets of interview questions and survey selected locations to determine the extent of truck activity and the amount of idling at those locations. Surveys were in the form of interviews with the on-site facility managers.
- Perform observations during peak delivery times at some selected locations.

Table 3: Eight-Hour Ozone Nonattainment Areas in Texas

Nonattainment areas	Counties	Classification	Attainment date required by EPA
Houston-Galveston-Brazoria (HGB)	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller	Severe	June 15, 2019
Dallas-Fort Worth (DFW)	Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, Rockwall	Moderate	June 15, 2010
Beaumont-Port Arthur (BPA)	Hardin, Jefferson, Orange	Moderate	June 15, 2010

CHAPTER 2: PRELIMINARY SURVEY OF RETAIL AND INDUSTRIAL LOCATIONS

The remainder of this report describes the survey of retail and industrial locations, including visits to chosen locations and interviews with managers on site to gain some insight about truck activity and on-site observations, and resulting findings.

The main aim of conducting the preliminary surveys of selected industrial and retail locations in the Houston and Beaumont areas was to identify potential locations for conducting follow-up observations of idling, and to also gather basic information of truck idling and activity that may be useful for this project. The preliminary survey process involved:

1. The identification of potential survey locations
2. Visiting these identified locations and conducting interviews with managers/staff on site
3. Summarize these results and identify a strategy for follow-up surveys.

The rationale behind the selection of locations for the preliminary survey is discussed in the next section. The sources for obtaining the preliminary information included:

- Selectory.com (a database of business information and company profiles [2])
- U.S. Census Bureau (2005 County Business Patterns by employment size [3])
- Texas Business Industry & Data Center (Office of the Texas Governor [7])
- National Retail Foundation (8)

Selection of Survey Locations

The following criteria were used to select the retail and industrial locations to be visited from among those listed in the various data sources:

1. Locations must fall within the NAICS classifications for retail/industrial facilities
2. Locations should have less than 500 employees. The researchers' experience from work conducted in FY 2008 indicated that large companies with over 500 employees were much less accessible than mid-size companies with relatively fewer employees. However, care was taken to also not include locations that had too few employees.
3. Location facility size must be greater than 30,000 square feet. A smaller size was only selected if there was no larger location in the city. A study of the database of retail and industry locations (2) indicated that facilities smaller than 30,000 square feet typically also had fewer employees. Thus, they were considered to have a lower potential for extended idling.
4. Locations were selected within air-quality nonattainment areas in Texas (specifically, the Beaumont and Houston regions[6])

Five major retailers were chosen for the surveys using the North American Industry Classification System (NAICS) as shown in Table 4; these were selected because they seemed

representative of major retail facilities with potential for frequent deliveries and associated idling. Using online resources with the classifications in Table 4, fifteen retail locations were chosen - five in Beaumont and ten in Houston. Retail facilities such as Wal-Mart that were known to have a “no idling” policy were not chosen.

Four industry sub-classifications under the NAICS were chosen for the surveys, as shown in Table 5. These four classifications were selected because they appeared to have a higher potential for extended idling. Industries that produce flammable products such as petroleum, petrochemical and rubber products were not selected since they prohibit idling. Using the previously cited data sources along with the NAICS classifications, 20 industrial locations were chosen - eight in Beaumont and twelve in Houston.

Table 4: Retailer Classifications and Locations Selected for Preliminary Survey

Company No.	Retailer	NAICS Code	NAICS Classification	Number of Stores Selected	
				Beaumont	Houston
1	Best Buy	443	Electronics and appliance stores	1	3
2	Kroger	445	Food and Beverage Stores	1	2
3	HEB	445	Food and Beverage Stores	2	0
4	Home Depot	444	Building Materials, Garden Equipment & Supplies Dealers	1	2
5	Kohl's	448	Clothing and Clothing accessories stores	0	3

Table 5: Industry Classifications and Locations Selected for Preliminary Survey

Company No.	NAICS Code	NAICS Main Classification	NAICS Sub Code	NAICS Sub Classification	Number of Locations Selected	
					Beaumont	Houston
1	33	Manufacturing	332	Fabricated metal products manufacturing	4	5
2	42	Wholesale trade	423	Merchants/Wholesalers (durable goods) - Lumber & Other Construction Materials wholesales	0	2
3	48	Transportation and Warehousing	484	Truck transportation	3	4
4	56	Administrative & Support, Waste Management & Remediation	562	Waste Management & Remediation Services	1	1

Truck Classification Terminology

From an emissions estimation/modeling perspective, the classification of trucks based on the Environmental Protection Agency’s (EPA’s) MOBILE 6 emissions model is the most relevant. These classifications are based on vehicle weight and are not as easily identifiable as classifications based on a general description of the truck. Thus, while conducting interviews with managers at retail locations, and for noting down idling activity at subsequent site surveys, the following truck descriptions were used:

- Semi-trailer/18-wheelers
- Panel truck
- Flatbed

The description of each of these truck types, as relevant to their use in this report, are described below:

Semi-Trailer/18-wheeler: This is an articulated truck comprising two units – a truck/tractor unit and a trailer unit. The tractor unit may have a built in sleeping cabin for the truck driver. The most common types have 18 wheels and are often referred to informally as 18-wheelers.

Panel Truck: A panel truck in its most common form is a single unit truck that could have between six and fourteen wheels. They can also be referred to as box trucks and are used to transport drinks, furniture, appliances or grocery supplies that can be held conveniently in the cargo.

Flatbeds: These are articulated trucks comprising two units – a truck/tractor unit and a flat bed or body usually non-enclosed with no sides or roof. It is used mainly to transport heavy loads that are non-delicate. The most common types have 18 wheels.

Preliminary Site Visits and Interviews

A total of thirteen locations were visited in Beaumont (eight industrial and five retail locations), while in Houston twenty-two locations were visited, including twelve industrial and ten retail locations. These site visits were aimed at making preliminary observations and obtaining information about idling potential through on-site interviews with staff.

Managers were interviewed to gain insight into the truck operations at those locations. Attempts were made at all 35 locations to carry out interviews with operations managers or employees knowledgeable about truck activity. The interviews took place from May 26 through May 29, 2009. A list of general questions was prepared and used as a guide to conducting the interviews (Appendix E).

At 23 locations (retail and industries), interviews were carried out mostly with store managers or operations managers at the retail stores, and with plant managers, product managers or transport coordinators at the industrial locations. Due to schedule conflicts, three interviews were conducted over the phone at a later date. Most managers were responsive and provided useful information about the volumes, types and movement of trucks in and out of their locations. Some interviewees indicated that there was some amount of idling which they were unable to quantify. A few of the managers, however, were not willing to answer questions without clearance from their corporate offices. Overall, the response rate in Beaumont was much higher than in Houston.

Summary of Interviews - Beaumont

Staff interviewed at all five selected retail locations in Beaumont provided substantial information about the truck activity at those locations. Managers at four of the eight industrial locations in Beaumont provided some relevant information, while at the remaining four locations the managers were unavailable. The information obtained from the retail and the industrial facilities visited are summarized in Table 6 and Table 7 respectively.

It should be noted that the number of trucks provided in the tables are approximations made by managers/staff during the interviews. The tables do not include locations where interviewees were either unresponsive or unavailable, or where interviews could not be conducted for other reasons. However, the tables include summaries of all interviews conducted by phone.

Table 6: Information Obtained from Interviews at Retail Facilities in Beaumont

Retail Store/ Size (sq.ft.)	Delivery days per week	Trucks per day	Trucks per week	Peak delivery time	Types of trucks	Time spent at location	Any idling?
Best Buy / 33,000	2	-	5	Evenings	Semi-trailers	45 - 60 minutes or overnight	No
Home Depot / 107,000	Every day	45	Varies	Night time	Semi-trailers, flatbeds, panel trucks	45 - 60 minutes	Yes
Kroger / 58,000	Every day	5	Varies	6:30 - 10:00am; 2:00 - 3:30pm; night time	Semi-trailers, panel trucks	15 - 30 minutes	Kroger trucks (No), Vendors (Maybe)
H E B / 28,000	Every day	15	Varies	6:30 - 11:00am	Semi-trailers, panel trucks	30 - 45 minutes	No
H E B / 26,000	Every day	12 - 16	Varies	6:30 - 11:00am mostly	Semi-trailers, panel trucks	30 - 45 minutes	No

Table 7: Information Obtained from Interviews at Industrial Facilities in Beaumont

Company	Industry Classification	Delivery days per week	Trucks per day	Peak Delivery Time	Trucks per week	Nature of deliveries	Types of trucks	Time spent at location	Any idling?
Bell Fence and Galvanizing	Manufacturing	3	6 - 7	Varies	Varies	Incoming and Outgoing	Flatbeds mostly	30 - 45 minutes	Yes
Trimac Transportation	Transportation	Company manager was interviewed. Their tankers carry products from chemical companies and transport to destinations around the country.				No deliveries on site; they own a fleet of tanker trucks	Tanker trucks (chemicals)	Varies	No
Enterprise Transportation	Transportation	Company manager was interviewed. Their tankers carry products from chemical companies and transport to destinations around the country.				No deliveries on site; they own a fleet of tanker trucks	Tanker trucks (chemicals)	Varies	No
Waste Mgmt of Texas*	Waste Management	Company representative was interviewed over the phone and said that several trucks came in daily but did not idle while on the premises. There was no indication of any extended idling on the premises when researchers visited the company.							

**phone interview*

Summary of Interviews - Houston

Interviews at the retail locations visited in Houston provided substantial information about the truck activity, as summarized in Table 8. Managers at two of the twelve industrial locations visited in Houston provided some relevant information, while no representatives could be contacted at the other locations. Table 9 shows information obtained from the two industrial locations where interviews were conducted. As with the Beaumont data, the number of trucks given in the tables are approximations made by interviewees and are therefore provided only for locations where interviews were conducted.

Table 8: Information Obtained from Interviews at Retail Facilities in Houston

Retail Store/ Size (sq.ft.)	Delivery days per week	Trucks per day	Trucks per week	Peak delivery time	Types of trucks	Time spent at location	Any idling?
Best Buy / 46,000	4 (none on Wednesday)	1	4 – 5	Varies	Semi-trailers	45 – 60 minutes or overnight	No (Policy in place)
Best Buy / unavailable	-	1	5	Varies (depending on agreement with vendors)	Semi-trailers (vendors); panel trucks (store owned)	45 – 60 minutes or overnight	Maybe
Home Depot / 113,000	Every day	10	Varies	Varies	Semi-trailers, flatbeds, panel trucks	15 – 30 minutes	No
Kroger / unavailable	Every day	10 – 11	Varies	6:00am - 2:00pm (vendors); Kroger trucks as needed	Semi-trailer, panel trucks	20 – 30 minutes	No
Kroger / 64,900	Every day	6 – 8	Varies	6:30am - 2:00pm;	Panel trucks	15 – 30 minutes	No
Kohl's / 76,000	Varies	Varies	2 – 3 (3 – 4 at Xmas)	Varies (scheduled deliveries)	Semi-trailer	Trailers dropped off and picked up later	No
Kohl's / 76,000	Varies	Varies	2 – 3	Varies	Semi-trailer	Trailers dropped off and picked up later	No

Table 9: Information Obtained from Interviews at Industrial Facilities in Houston

Company	Industry Classification	Delivery days per week	Trucks per day	Peak Delivery Time	Nature of deliveries	Types of trucks	Time spent at location	Any idling?
Act Pipe and Supply (Phone Interview)	Whole Sale Trade	Every day	17 owned; 20 vendors	Varies	Incoming / Outgoing mostly	Flatbed	Load at night or 45 – 60 minutes daytime	Yes
Delta Steel L.P.	Manufacturing	Every day	14 – 15	Varies	Incoming / Outgoing	Flatbed	30 – 60 minutes	No

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Remarks on Preliminary Interviews

The response rate for the retail facilities was better in Beaumont than in Houston. Overall, the response rate was significantly higher for retail locations than for industries in both Beaumont and Houston. However, the ease of access for the industrial facilities in Beaumont was still much higher when compared to industrial facilities in Houston, where a majority of the contacted staff were either unavailable or were restricted by company policy from participating in any survey or interview.

CHAPTER 3: OBSERVATION OF DELIVERY OPERATIONS

Observations of delivery operations were conducted as a follow-up in selected locations to gain a better understanding of current delivery procedures and to observe any idling. The observations helped the researchers confirm the accuracy of the interviews previously conducted, and generated a second data set that could be used for observations and conclusions.

The researchers collected data by observing various retail and industrial locations in the Beaumont and Houston areas over a three day period. A majority of locations were selected from among those previously visited as a part of the preliminary survey. The observations were conducted from June 29 to July 1, 2009. They were conducted by observing truck delivery operations and activity from publicly accessible areas, such as parking lots, and thus did not require permission from authorities at the locations. A majority of industrial locations, however, were fenced off and heavily guarded and did not allow for such observation. When a suitable location was available, the researchers sat inside a passenger car and made observations for up to two hours. When such a location was not available, the researchers made frequent observations. The weather was hot on all days, and clear except for a thunderstorm during the first evening of observations at Beaumont. While there were very few trucks observed during the storm, the weather was not expected to have impacted the delivery operations and idling time. While the prevailing hot weather could have encouraged more idling by drivers for their comfort, it was observed that a majority of drivers did shut off their engines and leave the trucks while the delivery was in progress.

Observation Locations

Retail stores observed in Beaumont included the following: Best Buy, HEB on Lucas Drive, HEB on Dowlen Drive, HEB on 11th St, Home Depot, Kohl's, Kroger on Dowlen, and Lowe's. In Houston, a similar set of retail facilities was observed: Best Buy on Old Katy Road, HEB on Fry Road, Home Depot on Katy Freeway, and Home Depot, Kohl's, Kroger, Ross, and Linens-n-Things, all on Fry Road. Sizes and numbers of employees of these stores are presented in Appendix F.

Ross and Linens-n-Things were not originally intended to be part of this study, but were located near to other study locations. Since researchers noted that those stores had truck activity in the back, they chose to include these in their observations. It is to be noted here that Linens-n-Things had previously gone out of business – it is surmised that the truck idling observed at this location was either for store clearance purposes, or for some other store at a nearby shopping center which was making use of the Linens-n-Things area. The only industrial location that could be observed was Bell Fence in Beaumont. The details for this are also included in Appendix F.

Findings and Observations

Limited data are available for the industrial locations as they are much more protected than the retail locations. Most are fenced off, and visibility is limited. Coupled with unwillingness from industrial locations to allow the observation of their truck operations, it resulted in very little data

being recorded for the industrial locations. The only industrial location where observations were possible did not have any truck deliveries during the observation times.

At the retail locations, deliveries from various types of trucks were observed, including large and small panel trucks, refrigerated panel trucks, semi-trailers, and flatbeds. Some idled, but many did not. A detailed listing of the observations is available in Appendix G. Some observations relating to idling at different stages in the delivery/unloading process at the retail facilities are discussed here.

Idling upon Arrival: Upon arrival, most drivers idled for a short time (1-5 minutes) while consulting with store workers, opening the trailer doors, etc. The time for such activity exceeded five minutes only on one occasion - at the Home Depot in Beaumont where the loading dock was full upon a truck's arrival. The truck thus idled for 20 minutes while waiting for an available spot. While this was not a recurring problem among the observed locations, such idling could be prevalent in stores with more frequent deliveries.

Idling while Docking and Unloading: All drivers of the larger trucks were observed to turn their engines off once docked in the loading area. This was likely due to either company policy or as a courtesy to the workers who would otherwise be exposed to emissions in the loading area. However, idling was observed in smaller panel trucks at Kroger and HEB in both cities during unloading. These trucks did not dock, but rather parked near a back door. The maximum idling duration observed in these cases was 25 minutes.

Idling Subsequent to Unloading: Once unloaded, several trucks pulled away, parked nearby and idled for a short time. Usually, this time was spent closing the trailer doors and organizing paperwork, and took between 1 and 5 minutes. This was observed to be more or less similar at nearly every location. However, a few cases were noted where the driver ate or rested before leaving the area. In such cases, idling of up to 20 minutes was observed. For example, at HEB in Beaumont, a panel truck idled for 20 minutes while the driver ate in the cab.

Observed Longer-Term Idling: Only one truck was observed as idling for 30 minutes - at a Kroger location in Beaumont. However, there were four other trucks that may have idled for thirty minutes or longer - these were already idling when the researchers began the observation, and they were observed to idle for at least 20 minutes each. Three of these trucks were observed in the same shopping center area in Katy around 10 AM. They were observed behind Best Buy, Linens-n-Things, and Home Depot locations. The drivers of these trucks were not seen, and were assumed to be in the back of the cab sleeping or resting. The fourth such observation of extended idling occurred around 7 AM at Kroger in Beaumont, where the truck was being unloaded.

Overall Occurrence of Idling: 64 trucks were observed at retail locations, and details of each observed truck are provided in Appendix G. The trucks included a variety of trucks ranging from panel trucks to 18-wheelers. Overall, among the observations made, it was found that 34 percent of the trucks were idling. Extended idling (15 minutes or more) was observed for 14

percent of trucks overall and idling of 5-15 minutes and less than 5 minutes were 12 percent and 8 percent of total observations, respectively. Table 10 summarizes these results.

Table 10: Observation Results Summary

Total Number Trucks Observed at Retail Locations	64
Total Percent Not Idling	66%
Total Percent Idle	34%
<i>Percent Extended Idle</i>	<i>14%</i>
<i>Percent Idle 5-15 min</i>	<i>12%</i>
<i>Percent Idle 0-5 min</i>	<i>8%</i>

Inclusion of FY 2008 Observations

There were extensive observations made under the FY 2008 research for three retail locations. However, due to a slightly different approach used, the data from FY 2008 do not include the idling duration. However, Table 11 below summarizes the combined findings on the occurrence of idling in terms of number and percent trucks for all the retail stores observed.

Table 11: Observations for Retail FY 2008 and FY 2009

Observation	FY 2008	FY 2009
Total number of retail locations visited	3	16
Total number of trucks observed	51	64
Total number of trucks idling	9	22
Percent of trucks idling	18%	34%

CHAPTER 4: ESTIMATION OF EMISSIONS IMPACT OF EXTENDED IDLING

The overall aim of this research task is to quantify the possible emissions impact of extended idling in Texas due to retail and industries. From the discussion of the surveys and observations conducted to date, it is seen that there was more useful information obtained from the retail sector than from the industries. However, there exists sufficient information from previous research conducted by TTI and from the additional survey findings to create an estimate of the emissions impact of extended idling for both sectors. This section discusses the quantification of this impact, which deals only with NOx emissions.

Emissions Impact due to Extended Idling for Industrial Locations

Previous research on idling at industries in the Beaumont-Port Arthur region developed an estimation of NOx emissions from idling, based on factors including the number of employees. This relation is shown in Equation 1 (5):

$$TI = R \sum_{i=1}^n 0.5 \times (0.0875e_i) \quad \text{Equation 1}$$

Where:

TI = Total industry truck idling emissions in tons per day (TPD)

R = Average estimated NOx emissions rate of 135 grams per hour (0.0001488 tons per hour)

0.50 = Average duration of idling (50 minutes or 0.833 hours) times 0.60 (percentage of industries allowing idling); and

e_i = number of employees for industry i

This equation was applied to the industry details shown in Appendix C and Appendix D , to make an estimate of NOx emissions (tons per day) for the whole of Texas, as well as for the three individual nonattainment areas: Houston-Galveston-Brazoria (HGB), Beaumont-Port Arthur (BPA) and Dallas-Fort Worth (DFW). The average NOx emissions rate used in the analysis, 135g/hr was as specified by TCEQ (11). The results of this analysis are shown in Table 12.

Table 12: Estimate of NOx Emissions Due to Idling at Industrial Facilities

Area	Counties	NOx Emissions Due to Idling (Tons Per Day)
Houston-Galveston-Brazoria (HGB)	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller	42.72
Beaumont-Port Arthur (BPA)	Hardin, Jefferson, Orange	2.87
Dallas-Fort Worth (DFW)	Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, Rockwall	50.15
Total nonattainment areas	Counties in HGB, BPA, and DFW	95.75
Total Statewide		181.34

Emissions Impact due to Extended Idling for Retail Locations

Based on the observations for retail locations from the previous section, researchers similarly developed a relationship to estimate emissions due to idling, based on employee numbers. This relationship is shown in Equation 2:

$$TR = R \sum_i^n 0.134 \times (0.0573e_r) \tag{Equation 2}$$

TR = Total truck idling emissions in tons per day for retail locations (TPD)

R = Average estimated NOx emissions rate of 135 grams per hour (0.0001488 tons per hour)

0.134 = Average duration of idling (12 minutes or 0.2 hours) times 0.67 (percentage of retail locations allowing idling); and

0.0573 = Average daily trucks per employee

e_r = number of employees for industry r

This equation was applied to the retail information shown in Appendices A and B, to make an estimate of NOx emissions (tons per day) for entire Texas, as well as for the HGB, BPA and DFW areas. The results of this analysis are shown in Table 13.

Table 13: Estimate of NOx Emissions Due to Idling at Retail Facilities

Area	Counties	NOx Emissions Due to Idling (Tons Per Day)
Houston-Galveston-Brazoria (HGB)	Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, Waller	0.98
Beaumont-Port Arthur (BPA)	Hardin, Jefferson, Orange	0.09
Dallas-Fort Worth (DFW)	Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, Rockwall	1.10
Total nonattainment areas	Counties in HGB, BPA, and DFW	2.17
Total Statewide		4.57

Remarks on Emissions Estimates

The estimates developed in this section are obtained from highly aggregated datasets and generalizations. The overall findings provide a reasonable estimate of the emissions impact due to idling, though further site observations and an expanded research effort can aid in improving these estimates. It is seen that industrial locations overall account for much higher idling emissions than retail locations. The previous chapter discussed some of the difficulties faced by researchers in obtaining information. The next section discusses alternative approaches that can be used for furthering this research effort, especially for industries.

CHAPTER 5: CONCLUSIONS

Summary of Interviews and Site Observations

Overall, store managers/interviewees at retail locations were conservative in their estimation of how much idling takes place on their premises. Of the twelve retail store managers interviewed, only one said that idling occurs, and only two others indicated that it might be a possibility.

While the prior observations (in FY 2008) documented stores that did not have any idling, the observations during this research included at least one truck idling at every retail location where deliveries occurred. It is thus seen that even though a particular store might have a “no idling” policy, idling could still occur in the area, either before or after the delivery, especially by non-store trucks (those owned by vendors/other suppliers).

The first observation set (part of the original Task 8a) revealed that out of all the trucks observed, 18 percent idled. The second set of observations conducted as the follow-up for more locations in Beaumont and Houston indicated a greater prevalence of idling. It was seen that 14 percent of all trucks idled for an extended period of time, while idling of 15 minutes or less was close to 20 percent of all trucks. This represents a greater amount of idling than the interviews indicated.

No conclusions can be made about the industrial locations, as researchers faced the same difficulties as with previous research efforts. Industries are generally more concerned about safety and privacy, and are not willing to participate or allow access to their facilities for observation of idling. From the few interviews conducted with operations managers at the industries, it appears that idling occurs to a certain extent. Since interviewees at some locations openly admitted to idling occurring on their property, it is speculated that these probably represent significant amounts of idling (as interviewees tended to underestimate the overall extent of idling, as seen in the results from the retail locations). However, it must also be noted that many industries (such as those involved with petrochemicals or other flammable and sensitive products) also prohibit idling and probably have a 100 percent compliance to this rule for safety purposes. Also, the deliveries to industrial locations tend to vary greatly in length and nature, unlike the more predicable nature of deliveries to retail locations. As previously concluded, all these factors contribute to make industrial locations very uncertain generators of idling.

Estimation of Impact of Extended Idling at Retail and Industrial Facilities

Previous research on industrial facilities and the occurrence of extended idling was used to estimate the NO_x emissions impact of idling at industries across Texas, and specifically in Texas’ nonattainment areas. For industries in the nonattainment areas of Texas the total estimated NO_x emissions is approximately 95 tons per day with DFW area contributing the highest (50 tons per day) while for Texas as a whole the estimate is 181 tons per day. The total estimated NO_x emissions for retail sector in the nonattainment areas is much less than for industries, at around 2.1 tons per day, with DFW area again being the largest contributor (1.1 tons per day). Statewide, the estimated NO_x emissions are approximately 4.5 tons per day.

This indicates that while some idling does occur in retail locations, industries seem to be a far greater contribution to emissions due to idling, and would be the best target for idle reduction programs and policy. However, researchers faced difficulty in carrying out observations and interviews for industry locations, despite attempts at advance phone calls, “cold calls” and site visits. Further data collection for industries can help refine emissions estimates for greater accuracy. Other approaches, including obtaining higher-level permission through corporate offices, advance reconnaissance for better planning of observation locations, and truck driver interviews could all help in updating the inventory for industrial locations. While more data were obtained for retail locations, similar approaches and an expanded survey effort can also help in refining the estimations for the retail sector.

Impact of No-Idling Policies and Other Measures

Several cities and counties in Texas and in other states around the USA have idling reduction regulations in place. These regulations (12) aim to restrict trucks from idling for extended durations, unless absolutely necessary due to weather conditions or other factors. However, little is known about how these regulations are enforced. It is concluded that such regulations are fairly difficult to enforce and require self-regulation on the part of truck operators and support from the locations at which these trucks operate.

While Texas’ State Implementation Plan (SIP) restricts idling in the Houston-Galveston area to five minutes between April and October (13;14), there are no specific laws listed for Harris County (where the Houston observations were conducted) and Jefferson County (where the Beaumont operations were conducted). While there were signs prohibiting idling at some of the locations, and some store managers indicated the existence of no-idling policies, non-compliance was still observed. Without knowledge of the extent of idling prior to implementation of idling restrictions, it is difficult to gauge the level of success that such regulations have in actually reducing idling.

There are also other factors, mainly economic concerns, which can help drive reductions in idling. Idling trucks consume significant amounts of fuel, which can be reduced by using on-board idle reduction devices, or simply not idling unless absolutely necessary. Also, in the cases of truck drivers operating on a fixed daily budget, idle reduction can save money. While the prices of fuel have reduced since peaking in 2008, costs are still a major concern in the current economic situation, making this an important aspect of idle reduction policy and enforcement.

Final Remarks

The findings from this study estimated that a fairly significant amount of extended idling (approximately 14 percent of observations) and idling of lesser duration (approximately 20 percent of observations) occurred at retail facilities around Texas. This was greater than estimated from interviews and previous observations conducted by the research team. While conclusive information could not be obtained about industrial locations, it was surmised that

those industrial locations that did not explicitly prohibit idling from a safety standpoint were likely to have longer-term idling of greater magnitude than retail locations. On applying the retail findings to estimate daily NO_x emissions (for nonattainment areas, and statewide), and comparing with a preliminary inventory of idling from industries, it was seen that overall, industrial locations contributed more to the occurrence of extended idling. Researchers also identified means of further expanding future surveys, and alternate approaches to obtain more information, especially for industries. While the impact of no-idle regulations and policies could not be assessed from these findings, there are indications that these policies, combined with economic factors, and the availability of alternatives to idle reduction can help in targeting the kind of idling observed at retail and industrial facilities. Overall, the following are possible approaches to idle reduction at industries and retail locations to help reduce emissions in nonattainment areas in Texas:

- Educational approaches to promote public knowledge and driver compliance;
- Policy-based approaches including idle regulation laws previously discussed; and
- The use of stationary and on-board idle reduction technologies. For retail and industrial locations, on-board technologies such as Auxiliary Power Units (APUs) are probably the most viable.

Further research as outlined in this chapter can help refining emissions inventories, and also track the effectiveness of implementing such policy measures and technologies for idle reduction.

REFERENCES

1. U.S. Environmental Protection Agency (EPA) Guidance for Quantifying and Using Long Duration Truck Idling Emissions Reduction in State Implementation Plans and Transportation Conformity. Publication EPA420-B-04-001. January 2004.
2. Selectory Business Database, <http://www.selectory.com/>
3. U.S. Census Bureau, American Fact finder, 2005 County Business Patterns: Geography Area Series, http://factfinder.census.gov/servlet/IBQTable?_bm=y&-ds_name=CB0500A2&-_skip=200&-geo_id=05000US48245&-search_results=01000US&-_lang=en/ Release date July 2007.
4. Texas Transportation Institute, *Major Truck Idling Generators in Texas: Extended Idling Task 8a*, Prepared for Texas Department of Transportation, August 2008.
5. Zietsman J. and Perkinson D.G. Heavy-Duty Diesel Vehicle (HDDV) Idling Activity and Emissions Study: Phase 1 – Study Design and Estimation of magnitude of the Problem. Texas Transportation Institute. August 2003.
6. Texas Commission on Environmental Quality, Texas Attainment status by Region, <http://www.tceq.state.tx.us/implementation/air/sip/siptexas.html>
7. Office of the Governor. Economic Development, Texas Business Industry and Data Center, http://governor.state.tx.us/ecodev/business_research/subjects/
8. National Retail Foundation. Top 100 retailers, http://www.nrf.com/modules.php?name=Pages&sp_id=461/ July 2008
9. Heavy Duty Trucks USA, Truck types, 2008, http://heavydutytrucksusa.com/truck_types.php
10. US Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, FHWA Vehicle types, April 1, 2008, <http://www.fhwa.dot.gov/policy/ohpi/vehclass.htm>
11. Texas Commission on Environmental Quality, On-Vehicle Infrastructure and Automatic Shutdown Devices, Revised October 2008, http://www.tceq.state.tx.us/assets/public/implementation/air/terp/techsup/TS_OVInfrastructure_2009.pdf
12. American Transportation Research Institute, Compendium of Idling Regulations, June 2009, http://www.atri-online.org/index.php?option=com_content&view=article&id=164&Itemid=70
13. Fleet Owner, State and Municipal Idling Regulations. September 16, 2003. http://fleetowner.com/news/fleet_state_municipal_idling/
14. Environmental Protection Agency, Summary of State Anti-Idling Regulations. EPA420-S-03-002. February 2003, <http://www.epa.gov/otaq/smartway/documents/statelaws.pdf>

APPENDIX A: RETAIL ESTABLISHMENT BY TYPE AND NUMBER OF EMPLOYEES IN TEXAS

Sector	Number of Employees				
	Total	100 to 249	250 to 499	500 to 999	Over 1,000
Texas					
Motor vehicle, parts dealers	313	291	21	1	0
Furniture, home furnishings	20	17	3	0	0
Electronics, appliances	64	52	9	2	1
Building materials, garden	239	235	3	1	0
Food, beverage	470	424	46	0	0
Health, personal care	13	9	3	1	0
Gasoline stations	18	16	1	11	0
Clothing, accessories	34	26	7	1	0
Sporting goods, hobby, book, music	17	14	2	0	1
General merchandise	712	434	229	49	0
Miscellaneous retailers	14	13	1	0	0
Total	1,914	1,531	325	66	2
Beaumont					
Motor vehicle, parts dealers	6	6	0	0	0
Furniture, home furnishings	0	0	0	0	0
Electronics, appliances	1	1	0	0	0
Building materials, garden	4	4	0	0	0
Food, beverage	5	5	0	0	0
Health, personal care	2	2	0	0	0
Gasoline stations	1	1	0	0	0
Clothing, accessories	0	0	0	0	0
Sporting goods, hobby, book, music	0	0	0	0	0
General merchandise	16	10	5	1	0
Miscellaneous retailers	0	0	0	0	0
Total	35	29	5	1	0
Dallas / Fort Worth					
Motor vehicle, parts dealers	106	97	9	0	0
Furniture, home furnishings	8	8	0	0	0
Electronics, appliances	23	15	6	1	1
Building materials, garden	76	73	2	1	0
Food, beverage	104	98	6	0	0
Health, personal care	9	6	3	0	0
Gasoline stations	3	3	0	0	0
Clothing, accessories	15	11	3	1	0
Sporting goods, hobby, book, music	7	5	1	0	1
General merchandise	195	129	50	16	0
Miscellaneous retailers	7	7	0	0	0
Total	553	452	80	19	2
El Paso					
Motor vehicle, parts dealers	10	10	0	0	0
Furniture, home furnishings	0	0	0	0	0
Electronics, appliances	2	2	0	0	0
Building materials, garden	6	6	0	0	0
Food, beverage	7	7	0	0	0
Health, personal care	0	0	0	0	0
Gasoline stations	1	1	0	0	0
Clothing, accessories	1	1	0	0	0
Sporting goods, hobby, book, music	0	0	0	0	0
General merchandise	22	14	2	6	0

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Sector	Number of Employees				
	Total	100 to 249	250 to 499	500 to 999	Over 1,000
Miscellaneous retailers	1	0	1	0	0
Total	50	41	3	6	0
Houston					
Motor vehicle, parts dealers	87	78	9	0	0
Furniture, home furnishings	8	6	2	0	0
Electronics, appliances	16	14	2	0	0
Building materials, garden	64	63	1	0	0
Food, beverage	120	116	4	0	0
Health, personal care	0	0	0	0	0
Gasoline stations	3	3	0	0	0
Clothing, accessories	7	4	3	0	0
Sporting goods, hobby, book, music	4	4	0	0	0
General merchandise	150	94	45	11	0
Miscellaneous retailers	5	5	0	0	0
Total	464	387	66	11	0

APPENDIX B: RETAIL FACILITIES WITHIN TEXAS NONATTAINMENT AREAS/COUNTIES

Name	Employment Class	441	442	443	444	445	446	447	448	451	452	453	Total
Texas State	Total	9620	4357	3504	5424	9207	5669	10246	10429	3400	3875	7891	73622
	Under 100	9307	4337	3440	5185	8737	5656	10228	10395	3383	3163	7877	71708
	100-249	291	17	52	235	424	9	16	26	14	434	13	1531
	250-499	21	3	9	3	46	3	1	7	2	229	1	325
	500-999	1	0	2	1	0	1	1	1	0	49	0	56
	1000 or more	0	0	1	0	0	0	0	0	1	0	0	2
Beaumont													
Hardin County	Under 100	37	1	1	13	21	4	26	7	1	7	12	130
	100-249	0	0	0	0	1	0	0	0	0	0	0	1
	250-499	0	0	0	0	0	0	0	0	0	2	0	2
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Jefferson County	Under 100	108	46	55	67	126	88	156	157	47	38	80	968
	100-249	6	0	1	4	3	2	1	0	0	8	0	25
	250-499	0	0	0	0	0	0	0	0	0	2	0	2
	500-999	0	0	0	0	0	0	0	0	0	1	0	1
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Orange County	Under 100	38	9	11	20	31	18	66	24	7	13	28	265
	100-249	0	0	0	0	1	0	0	0	0	2	0	3
	250-499	0	0	0	0	0	0	0	0	0	1	0	1
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Dallas/ Fort Worth													
Collin County	Under 100	160	179	154	96	173	176	211	442	121	53	212	1977
	100-249	15	1	2	9	8	0	0	2	2	27	0	66
	250-499	1	0	1	0	3	0	0	1	0	9	0	15
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Dallas County	Under 100	822	514	386	367	992	633	770	1200	369	274	785	7112
	100-249	38	4	6	26	48	4	0	6	0	47	6	185
	250-499	4	0	2	0	1	2	0	1	1	13	0	24
	500-999	0	0	0	1	0	0	0	1	0	9	0	11
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Denton County	Under 100	142	78	86	99	136	122	166	194	90	49	154	1316

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Name	Employment Class	441	442	443	444	445	446	447	448	451	452	453	Total
	100-249	10	0	2	7	8	0	0	1	0	13	0	41
	250-499	1	0	1	0	0	1	0	0	0	6	0	9
	500-999	0	0	0	0	0	0	0	0	0	1	0	1
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Ellis County	Under 100	57	14	5	24	41	22	69	28	11	21	52	344
	100-249	0	0	0	1	3	0	0	0	0	1	0	5
	250-499	0	0	0	0	0	0	0	0	0	2	0	2
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Johnson County	Under 100	71	22	16	38	32	24	56	27	23	24	45	378
	100-249	1	0	0	1	1	0	1	0	0	1	0	5
	250-499	0	0	0	0	0	0	0	0	0	0	0	0
	500-999	0	0	0	0	0	0	0	0	0	2	0	2
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Kaufman County	Under 100	46	19	10	28	42	17	46	37	4	18	35	302
	100-249	1	0	0	2	1	0	1	0	0	0	0	5
	250-499	0	0	0	0	0	0	0	0	0	1	0	1
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Parker County	Under 100	36	15	14	26	28	16	47	20	13	14	32	261
	100-249	2	0	0	2	0	0	1	0	0	0	0	5
	250-499	0	0	0	0	0	0	0	0	0	0	0	0
	500-999	0	0	0	0	0	0	0	0	0	1	0	1
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Rockwall County	Under 100	22	13	15	20	11	17	25	18	7	3	30	181
	100-249	0	0	0	2	0	0	0	0	0	2	0	4
	250-499	0	0	0	0	0	0	0	0	0	1	0	1
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Tarrant County	Under 100	611	334	274	303	560	451	589	793	275	195	542	4927
	100-249	30	3	5	23	29	2	0	2	3	38	1	136
	250-499	3	0	2	0	2	0	0	1	0	18	0	26
	500-999	0	0	1	0	0	0	0	0	0	3	0	4
	1000 or more	0	0	1	0	0	0	0	0	1	0	0	2
Houston													
Brazoria County	Under 100	83	37	27	53	82	51	119	70	19	37	72	650

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Name	Employment Class	441	442	443	444	445	446	447	448	451	452	453	Total
	100-249	3	0	0	4	4	0	0	0	0	4	0	15
	250-499	0	0	0	0	0	0	0	0	0	4	0	4
	500-999	0	0	0	0	0	0	0	0	0	1	0	1
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Chambers County	Under 100	6	2	1	8	16	4	15	2	1	6	9	70
	100-249	0	0	0	0	0	0	0	0	0	0	0	0
	250-499	0	0	0	0	0	0	0	0	0	0	0	0
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Fort Bend County	Under 100	95	67	61	60	174	93	163	126	53	30	92	1014
	100-249	2	0	1	6	7	0	0	2	1	7	2	28
	250-499	1	0	0	0	0	0	0	0	0	6	0	7
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Galveston County	Under 100	100	32	29	72	124	66	141	102	39	30	95	830
	100-249	3	0	0	3	4	0	0	0	1	5	0	16
	250-499	0	0	0	0	0	0	0	0	0	4	0	4
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Harris County	Under 100	1289	757	560	576	1758	992	1371	1838	556	419	1091	11207
	100-249	62	6	11	45	85	0	2	1	2	66	3	283
	250-499	8	2	2	1	4	0	0	3	0	27	0	47
	500-999	0	0	0	0	0	0	0	0	0	8	0	8
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Liberty County	Under 100	32	4	6	22	31	10	36	10	3	12	17	183
	100-249	0	0	0	0	1	0	0	0	0	2	0	3
	250-499	0	0	0	0	0	0	0	0	0	1	0	1
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Montgomery County	Under 100	128	73	42	90	114	86	139	161	61	40	111	1045
	100-249	5	0	1	5	14	0	1	1	0	8	0	35
	250-499	0	0	0	0	0	0	0	0	0	3	0	3
	500-999	0	0	0	0	0	0	0	0	0	2	0	2
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0
Waller County	Under 100	19	7	8	16	24	9	35	17	9	9	11	164

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Name	Employment Class	441	442	443	444	445	446	447	448	451	452	453	Total
	100-249	3	0	1	0	1	0	0	0	0	2	0	7
	250-499	0	0	0	0	0	0	0	0	0	0	0	0
	500-999	0	0	0	0	0	0	0	0	0	0	0	0
	1000 or more	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX C: ESTABLISHMENTS IN TEXAS BY INDUSTRY AND SIZE

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Texas					
Total for all sector	485,113	8,933	2,318	911	483
Forestry, fishing, hunting	1,182	4	2	0	0
Mining	6,175	103	31	17	17
Utilities	2,121	68	13	4	1
Construction	38,873	568	125	47	19
Manufacturing	18,877	1,111	365	137	62
Wholesale trade	30,532	455	94	38	14
Retail trade	74,400	1,544	330	57	4
Transportation, Warehousing	14,722	342	107	47	27
Information	9,059	262	99	40	26
Finance, Insurance	34,664	386	134	64	29
Real estate, rental, leasing	24,727	105	26	7	3
Professional, scientific, technical	54,917	500	132	45	24
Management of companies	3,467	243	122	56	29
Administrative, Support, Waste Mgmt	22,095	919	295	129	83
Educational Services	4,711	111	26	18	12
Health care, social assistance	49,831	1,058	285	164	122
Arts, entertainment, recreation	5,942	134	27	10	4
Accommodation, food services	39,136	763	66	20	4
Other services	48,269	257	39	11	3
Industries not classified	1,413	0	0	0	0
Beaumont					
Total for all sector	7,609	137	38	20	8
Forestry, fishing, hunting	25	0	0	0	0
Mining	43	1	0	0	0
Utilities	30	2	0	0	0
Construction	546	13	6	4	0
Manufacturing	290	25	13	5	2
Wholesale trade	379	7	0	1	0
Retail trade	1,387	29	5	1	0
Transportation, Warehousing	237	5	0	0	0
Information	106	1	2	0	0
Finance, Insurance	510	1	0	0	0
Real estate, rental, leasing	327	0	0	0	0
Professional, scientific, technical	640	8	4	1	0
Management of companies	42	3	0	1	0
Administrative, Support, Waste Mgmt	330	9	5	2	2
Educational Services	68	0	0	0	0
Health care, social assistance	1,014	20	3	5	4
Arts, entertainment, recreation	94	1	0	0	0

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Accommodation, food services	563	8	0	0	0
Other services	957	4	0	0	0
Industries not classified	21	0	0	0	0
Dallas / Fort Worth					
Total for all sector	128,275	2,892	747	289	286
Forestry, fishing, hunting	94	1	1	0	0
Mining	840	6	2	0	2
Utilities	292	12	1	0	0
Construction	9,925	180	33	14	2
Manufacturing	5,411	355	105	35	36
Wholesale trade	8,997	193	45	19	6
Retail trade	17,465	459	79	19	6
Transportation, Warehousing	3,103	123	48	19	30
Information	2,902	115	47	23	24
Finance, Insurance	9,879	182	65	36	32
Real estate, rental, leasing	6,766	46	15	3	4
Professional, scientific, technical	17,139	158	46	10	20
Management of companies	1,289	101	45	23	22
Administrative, Support, Waste Mgmt	6,936	318	109	41	28
Educational Services	1,410	41	9	7	8
Health care, social assistance	12,826	237	42	29	56
Arts, entertainment, recreation	1,534	45	8	4	2
Accommodation, food services	9,769	229	26	5	6
Other services	11,386	91	21	2	2
Industries not classified	312	0	0	0	0
El Paso					
Total for all sector	12,409	195	60	21	22
Forestry, fishing, hunting	14	0	0	0	0
Mining	19	1	0	0	0
Utilities	17	4	0	0	0
Construction	867	4	1	1	0
Manufacturing	551	31	16	2	0
Wholesale trade	989	6	3	0	0
Retail trade	2,157	41	3	6	0
Transportation, Warehousing	727	14	5	0	0
Information	172	6	5	1	2
Finance, Insurance	741	5	1	1	0
Real estate, rental, leasing	651	1	1	0	0
Professional, scientific, technical	1,099	3	3	0	0
Management of companies	70	1	3	0	0
Administrative, Support, Waste Mgmt	512	21	11	4	8
Educational Services	109	2	0	0	0
Health care, social assistance	1,233	31	6	5	12
Arts, entertainment, recreation	128	2	0	0	0

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Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Accommodation, food services	1,121	19	1	0	0
Other services	1,179	3	1	1	0
Industries not classified	53	0	0	0	0
Houston					
Total for all sector	110,713	2,290	585	230	234
Forestry, fishing, hunting	92	1	0	0	0
Mining	1,079	23	10	7	12
Utilities	474	18	7	3	0
Construction	7,875	171	43	23	28
Manufacturing	4,761	268	97	28	20
Wholesale trade	8,342	124	25	7	6
Retail trade	15,687	390	67	11	0
Transportation, Warehousing	2,933	99	31	12	20
Information	1,739	47	11	5	6
Finance, Insurance	7,940	82	23	10	12
Real estate, rental, leasing	5,989	29	5	2	2
Professional, scientific, technical	14,901	195	53	24	16
Management of companies	930	86	53	26	20
Administrative, Support, Waste Mgmt	5,490	250	64	27	24
Educational Services	1,176	26	8	2	4
Health care, social assistance	11,233	172	46	26	56
Arts, entertainment, recreation	1,240	38	11	5	2
Accommodation, food services	8,415	198	20	6	2
Other services	10,081	73	11	6	4
Industries not classified	336	0	0	0	0

APPENDIX D: INDUSTRIAL FACILITIES WITHIN TEXAS NONATTAINMENT AREAS/COUNTIES

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Beaumont – Hardin					
Total for all sector	727	8	3	1	0
Forestry, fishing, hunting	12	0	0	0	0
Mining	17	1	0	0	0
Utilities	3	0	0	0	0
Construction	99	0	0	1	0
Manufacturing	30	3	0	0	0
Wholesale trade	22	0	0	0	0
Retail trade	132	1	2	0	0
Transportation, Warehousing	25	0	0	0	0
Information	10	0	0	0	0
Finance, Insurance	43	0	0	0	0
Real estate, rental, leasing	29	0	0	0	0
Professional, scientific, technical	46	0	0	0	0
Management of companies	4	0	0	0	0
Administrative, Support, Waste Mgmt	23	0	0	0	0
Educational Services	4	0	0	0	0
Health care, social assistance	60	3	1	0	0
Arts, entertainment, recreation	12	0	0	0	0
Accommodation, food services	58	0	0	0	0
Other services	95	0	0	0	0
Industries not classified	3	0	0	0	0
Beaumont – Jefferson					
Total for all sector	5540	113	26	17	8
Forestry, fishing, hunting	10	0	0	0	0
Mining	21	0	0	0	0
Utilities	17	2	0	0	0
Construction	339	11	5	3	0
Manufacturing	184	16	9	3	2
Wholesale trade	315	7	0	1	0
Retail trade	986	25	2	1	0
Transportation, Warehousing	165	2	0	0	0
Information	79	1	2	0	0
Finance, Insurance	386	1	0	0	0
Real estate, rental, leasing	244	0	0	0	0
Professional, scientific, technical	506	7	3	1	0
Management of companies	35	3	0	1	0
Administrative, Support, Waste Mgmt	267	9	4	2	2
Educational Services	50	0	0	0	0
Health care, social assistance	806	17	1	5	4

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Arts, entertainment, recreation	63	1	0	0	0
Accommodation, food services	386	8	0	0	0
Other services	667	3	0	0	0
Industries not classified	14	0	0	0	0
Beaumont – Orange					
Total for all sector	1342	16	9	2	0
Forestry, fishing, hunting	3	0	0	0	0
Mining	5	0	0	0	0
Utilities	10	0	0	0	0
Construction	108	2	1	0	0
Manufacturing	76	6	4	2	0
Wholesale trade	42	0	0	0	0
Retail trade	269	3	1	0	0
Transportation, Warehousing	47	3	0	0	0
Information	17	0	0	0	0
Finance, Insurance	81	0	0	0	0
Real estate, rental, leasing	54	0	0	0	0
Professional, scientific, technical	88	1	1	0	0
Management of companies	3	0	0	0	0
Administrative, Support, Waste Mgmt	40	0	1	0	0
Educational Services	14	0	0	0	0
Health care, social assistance	148	0	1	0	0
Arts, entertainment, recreation	19	0	0	0	0
Accommodation, food services	119	0	0	0	0
Other services	195	1	0	0	0
Industries not classified	4	0	0	0	0

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Houston – Brazoria					
Total for all sector	4180	65	13	9	6
Forestry, fishing, hunting	7	0	0	0	0
Mining	24	1	0	0	0
Utilities	18	0	0	0	0
Construction	380	8	2	3	4
Manufacturing	187	14	4	2	2
Wholesale trade	201	4	0	0	0
Retail trade	674	15	4	1	0
Transportation, Warehousing	142	0	1	0	0
Information	64	0	0	0	0
Finance, Insurance	273	1	0	0	0
Real estate, rental, leasing	241	0	0	0	0
Professional, scientific, technical	364	1	0	0	0

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Management of companies	18	0	0	0	0
Administrative, Support, Waste Mgmt	165	6	1	2	0
Educational Services	46	0	0	0	0
Health care, social assistance	438	6	1	1	0
Arts, entertainment, recreation	63	2	0	0	0
Accommodation, food services	351	6	0	0	0
Other services	509	1	0	0	0
Industries not classified	15	0	0	0	0
Houston – Chambers					
Total for all sector	401	4	2	0	0
Forestry, fishing, hunting	3	0	0	0	0
Mining	14	0	1	0	0
Utilities	3	0	0	0	0
Construction	40	0	0	0	0
Manufacturing	11	1	1	0	0
Wholesale trade	20	0	0	0	0
Retail trade	74	0	0	0	0
Transportation, Warehousing	28	0	0	0	0
Information	4	0	0	0	0
Finance, Insurance	22	0	0	0	0
Real estate, rental, leasing	15	0	0	0	0
Professional, scientific, technical	24	0	0	0	0
Management of companies	3	0	0	0	0
Administrative, Support, Waste Mgmt	18	0	0	0	0
Educational Services	1	0	0	0	0
Health care, social assistance	26	1	0	0	0
Arts, entertainment, recreation	6	1	0	0	0
Accommodation, food services	39	0	0	0	0
Other services	48	1	0	0	0
Industries not classified	2	0	0	0	0
Houston – Fort Bend					
Total for all sector	7251	115	29	6	4
Forestry, fishing, hunting	8	0	0	0	0
Mining	73	0	1	0	0
Utilities	36	1	0	1	0
Construction	585	13	1	0	0
Manufacturing	282	18	7	1	2
Wholesale trade	531	7	1	0	0
Retail trade	1055	28	7	0	0
Transportation, Warehousing	99	0	0	1	0
Information	117	2	0	0	0
Finance, Insurance	499	2	1	0	0
Real estate, rental, leasing	349	1	0	0	0
Professional, scientific, technical	998	6	2	0	2

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Management of companies	36	6	2	2	0
Administrative, Support, Waste Mgmt	387	6	2	0	0
Educational Services	97	3	0	0	0
Health care, social assistance	796	4	4	1	0
Arts, entertainment, recreation	80	4	0	0	0
Accommodation, food services	563	12	1	0	0
Other services	648	2	0	0	0
Industries not classified	12	0	0	0	0
Houston – Galveston					
Total for all sector	4966	59	19	2	6
Forestry, fishing, hunting	5	1	0	0	0
Mining	24	0	0	0	0
Utilities	22	1	0	0	0
Construction	400	0	0	0	0
Manufacturing	153	5	3	0	2
Wholesale trade	201	1	0	0	0
Retail trade	856	16	4	0	0
Transportation, Warehousing	149	1	0	0	0
Information	60	1	0	0	0
Finance, Insurance	312	1	2	0	2
Real estate, rental, leasing	264	1	0	0	0
Professional, scientific, technical	497	1	0	0	0
Management of companies	29	0	1	0	0
Administrative, Support, Waste Mgmt	211	4	0	0	0
Educational Services	47	0	0	0	0
Health care, social assistance	496	9	4	1	2
Arts, entertainment, recreation	114	0	2	1	0
Accommodation, food services	526	15	3	0	0
Other services	583	2	0	0	0
Industries not classified	17	0	0	0	0
Houston – Harris					
Total for all sector	84602	1913	495	205	204
Forestry, fishing, hunting	31	0	0	0	0
Mining	828	22	8	7	12
Utilities	346	15	7	2	0
Construction	5470	141	38	20	24
Manufacturing	3714	214	76	25	14
Wholesale trade	6854	106	24	7	6
Retail trade	11574	286	48	8	0
Transportation, Warehousing	2295	96	28	10	20
Information	1372	42	11	5	6
Finance, Insurance	6175	76	20	10	10
Real estate, rental, leasing	4680	27	4	2	2
Professional, scientific, technical	11935	182	50	23	10

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Management of companies	793	77	48	23	14
Administrative, Support, Waste Mgmt	4249	221	60	24	24
Educational Services	878	22	7	2	4
Health care, social assistance	8621	142	34	22	50
Arts, entertainment, recreation	856	28	8	4	2
Accommodation, food services	6258	151	15	5	2
Other services	7407	65	9	6	4
Industries not classified	266	0	0	0	0
Houston – Liberty					
Total for all sector	1018	9	5	0	0
Forestry, fishing, hunting	15	0	0	0	0
Mining	23	0	0	0	0
Utilities	8	0	0	0	0
Construction	107	0	0	0	0
Manufacturing	36	1	1	0	0
Wholesale trade	40	0	0	0	0
Retail trade	198	3	1	0	0
Transportation, Warehousing	45	1	1	0	0
Information	20	0	0	0	0
Finance, Insurance	59	0	0	0	0
Real estate, rental, leasing	48	0	0	0	0
Professional, scientific, technical	79	0	0	0	0
Management of companies	3	0	0	0	0
Administrative, Support, Waste Mgmt	21	2	0	0	0
Educational Services	7	0	0	0	0
Health care, social assistance	95	2	2	0	0
Arts, entertainment, recreation	5	0	0	0	0
Accommodation, food services	77	0	0	0	0
Other services	131	0	0	0	0
Industries not classified	1	0	0	0	0
Houston – Montgomery					
Total for all sector	7333	112	19	8	12
Forestry, fishing, hunting	17	0	0	0	0
Mining	79	0	0	0	0
Utilities	37	1	0	0	0
Construction	786	9	1	0	0
Manufacturing	320	12	5	0	0
Wholesale trade	435	6	0	0	0
Retail trade	1087	35	3	2	0
Transportation, Warehousing	156	1	1	1	0
Information	87	2	0	0	0
Finance, Insurance	546	2	0	0	0
Real estate, rental, leasing	352	0	1	0	0
Professional, scientific, technical	914	5	1	1	4

Geographic Area and Sector	Number of Employees				
	Under 100	100 to 249	250 to 499	500 to 999	Over 1,000
Management of companies	44	3	2	1	4
Administrative, Support, Waste Mgmt	401	11	1	1	0
Educational Services	84	1	0	0	0
Health care, social assistance	687	8	0	1	4
Arts, entertainment, recreation	100	2	1	0	0
Accommodation, food services	532	12	1	1	0
Other services	653	2	2	0	0
Industries not classified	16	0	0	0	0
Houston – Waller					
Total for all sector	962	13	3	0	2
Forestry, fishing, hunting	6	0	0	0	0
Mining	14	0	0	0	0
Utilities	4	0	0	0	0
Construction	107	0	1	0	0
Manufacturing	58	3	0	0	0
Wholesale trade	60	0	0	0	0
Retail trade	169	7	0	0	0
Transportation, Warehousing	19	0	0	0	0
Information	15	0	0	0	0
Finance, Insurance	54	0	0	0	0
Real estate, rental, leasing	40	0	0	0	0
Professional, scientific, technical	90	0	0	0	0
Management of companies	4	0	0	0	2
Administrative, Support, Waste Mgmt	38	0	0	0	0
Educational Services	16	0	1	0	0
Health care, social assistance	74	0	1	0	0
Arts, entertainment, recreation	16	1	0	0	0
Accommodation, food services	69	2	0	0	0
Other services	102	0	0	0	0
Industries not classified	7	0	0	0	0

APPENDIX E: SURVEY QUESTIONS FOR EMPLOYEES AT SELECTED RETAIL/INDUSTRIAL FACILITY LOCATIONS

A. Survey Questions (On Truck Activity):

1. What is the nature and extent of truck activity at your location, in terms of
 - a. incoming deliveries
 - b. outgoing shipments
2. For incoming deliveries (as applicable)
 - a. What is the nature of the deliveries made to your facility location
 - i. types of goods delivered, from where
 - ii. Frequency of delivery – whether regularly scheduled or on an ad-hoc basis
 - b. Who operates the delivery fleet and what are the most common truck types (18-wheelers, panel trucks, etc.)
 - c. Delivery operations
 - i. How far in advance of the delivery time do trucks arrive
 - ii. How long would a truck spend on average at the location
 - iii. Is there a policy against idling truck engines while waiting at the location? If not, what are the general observations in terms of whether the truck drivers idle their engines while waiting.
 - iv. On the average, for each of the following activities how long do the trucks idle their engines while waiting? (please include durations for each)
 - Loading/ Unloading
 - Inspection/ Paperwork
 - Waiting in line
 - Other activity (Please specify)
3. For outgoing shipments (as applicable)
 - a. Nature and frequency of the shipments, to where are they shipped
 - b. Fleet information – operators, truck types
 - c. Shipment process – how far do trucks arrive in advance of shipment delivery, do they adhere to any no-idling policies, and how long on average do they stay at the location.
 - d. On the average, for each of the following activities how long do the trucks idle their engines while waiting?
 - Loading/ Unloading
 - Inspection/ Paperwork
 - Waiting in line
 - Other activity (Please specify)

B. Follow-Up Questions:

- What would you consider to be the “peak” times in terms of truck activity (both incoming and outgoing shipments)

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- Days of the week
- Hours of the days
- Would your company permit researchers to conduct a day-long observation of your loading dock operations and associated truck activity?
 - If yes, follow up with scheduling details and possible dates.

APPENDIX F: OBSERVATION LOCATIONS

Store	Address	Employees	Size(sf)*
Bell Fence Manufacturing	2725 S 11th St, Beaumont, TX 77701	Unknown	33,000
Best Buy	5885 Eastex Fwy, Beaumont, TX 77706-6921	100	33,000
Best Buy	9670 Old Katy Rd, Houston, TX 77055	100	46,000
HEB	3930 E Lucas Dr, Beaumont, TX 77708	80	28,000
HEB	3025 Dowlen Rd, Beaumont, TX 77706-7292	Unknown	113,000
HEB	1180 S 11th St, Beaumont, TX 77701	52	26,000
HEB	1550 Fry Road, Houston, TX 77084	200	67,000
Home Depot	3910 Eastex Fwy, Beaumont, TX 77703-1814	150	107,000
Home Depot	8400 Katy Fwy, Houston, TX 77024-1904	100	115,000
Home Depot	1111 N Fry Road, Katy, TX 77449-3341	150	113,000
Kohl's	4075 Dowlen Rd, Beaumont, TX 77706-6850	Unknown	76,000
Kohl's	1200 Fry Road, Houston, TX 77084-5807	133	76,000
Kroger	3965 Dowlen Rd, Beaumont, TX 77706	Unknown	58,000
Kroger	1705 N Fry Rd, Katy, TX 77449-3432	Unknown	64,900
Linens-n-Things*	1219 N Fry Rd #B, Katy, TX 77449-3342	**	36,000
Lowe's	4120 Dowlen Rd, Beaumont, TX 77706	300	145,000
Ross	1219 N Fry Rd #A, Katy, TX 77449-3342	25	300,00

**Size estimated from aerial views using a GIS program*

***Out of Business*

APPENDIX G: RESULTS OF SITE OBSERVATIONS

Date	Observation Start Time	City	Store	Location	Truck Type	Activity	Idling	Duration
6/29/2009	2:20 PM	Beaumont	Bell Fence	11th St	Flatbed, Semi-trailer	Parked	No	
6/29/2009	1:15 PM	Beaumont	Best Buy	Dowlen	Trailer, no tractor/truck attached	Docked	No	
6/29/2009	5:50 PM	Beaumont	Best Buy	Dowlen	Same trailer present as at 1:15pm, no tractor	Docked	No	
6/29/2009	6:40 PM	Beaumont	Best Buy	Dowlen	Same trailer present as at 1:15pm, no tractor	Docked	No	
6/29/2009	1:10 PM	Beaumont	HEB	Lucas	Trailer, no tractor	Docked	No	
6/29/2009	2:05 PM	Beaumont	HEB	Dowlen	None	None, sign says "Receiving 6am-1pm"	No	
6/29/2009	12:55 PM	Beaumont	Home Depot	Eastex Fwy	semi-trailer, flatbed	Parked, loading with forklift	No	
6/29/2009	5:10 PM	Beaumont	Home Depot	Eastex Fwy	semi-trailer	Parked	Yes	15 min
6/29/2009	5:20 PM	Beaumont	Home Depot	Eastex Fwy	Flatbed, semi-trailer	Parked at contractor pickup point	No	
6/29/2009	6:00 PM	Beaumont	Home Depot	Eastex Fwy	Flatbed, semi-trailer	Parked at contractor pickup point	No	
6/29/2009	7:05 PM	Beaumont	Home Depot	Eastex Fwy	Flatbed, semi-trailer	Parked at contractor pickup point	No	
6/29/2009	7:13 PM	Beaumont	Home Depot	Eastex Fwy	Semi-trailer without sleeper cab	Docked, unloaded	No	30 min
						Left Home Depot, stopped in parking lot to eat at restaurant	No	
6/29/2009	7:51 PM	Beaumont	Home Depot	Eastex Fwy	Semi-trailer with sleeper cab	Parked, talked to staff	Yes	1 min
						Docked	No	
						Moved truck, parked again, sat in truck	Yes	5 min
6/29/2009	8:15 PM	Beaumont	Home Depot	Eastex Fwy	Semi-trailer without sleeper cab	Parked	Yes	5 min
						Docked	No	

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Date	Observation Start Time	City	Store	Location	Truck Type	Activity	Idling	Duration
6/29/2009	8:18 PM	Beaumont	Home Depot	Eastex Fwy	Semi-trailer with sleeper cab	Parked, waiting on other truck	Yes	20 min
						Docked	No	20 min
						Moved truck, parked again, left with back doors open	Yes	5 min
6/30/2009	6:58 AM	Beaumont	HEB	Lucas	"Kraft" Semi-trailer without sleeper cab	Parked	Yes	5 min
						Unload	No	20 min
						Prepare to leave	Yes	4 min
6/30/2009	7:15 AM	Beaumont	HEB	Lucas	Small panel truck	Parked, talked to staff	Yes	1 min
6/30/2009	7:36 AM	Beaumont	HEB	Dowlen	"Blue Bell" panel truck	Parked	No	30 min
						Driver eating in cab	Yes	20 min
6/30/2009	7:36 AM	Beaumont	HEB	Dowlen	Unmarked panel truck	Parked	No	
6/30/2009	7:36 AM	Beaumont	HEB	Dowlen	"Pepsi" semi-trailer without sleeper cab	Docked	No	20 min
6/30/2009	7:43 AM	Beaumont	HEB	Dowlen	Semi-trailer with "HEB" trailer, no sleeper cab	Parked, talk to staff	Yes	1 min
						Docked	No	20 min
						Switch trailers	Yes	1 min
6/30/2009	8:44 AM	Beaumont	HEB	Dowlen	"Mrs. Baird's" panel truck	Park, unload	Yes	1 min
						Moves truck, goes inside	No	
6/30/2009	7:45 AM	Beaumont	Kohl's	Dowlen	None	None	No	
6/30/2009	7:00 AM	Beaumont	Kroger	Dowlen	3 small panel trucks	Parked	No	
6/30/2009	7:00 AM	Beaumont	Kroger	Dowlen	Semi-trailer "Pepsi" truck	Parked, unloading	Yes	At least 20 min
6/30/2009	7:20 AM	Beaumont	Kroger	Dowlen	Semi-trailer "7 up" truck	Parked	Yes	
6/30/2009	7:20 AM	Beaumont	Kroger	Dowlen	Small panel truck	Parked	No	
6/30/2009	8:05 AM	Beaumont	Kroger	Dowlen	Small panel truck	Parked	No	
6/30/2009	8:05 AM	Beaumont	Kroger	Dowlen	semi-trailer "Bud Light" truck	Parked	Yes	30 min

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Date	Observation Start Time	City	Store	Location	Truck Type	Activity	Idling	Duration
6/30/2009	8:20 AM	Beaumont	Kroger	Dowlen	4 small panel trucks	Parked	No	
6/30/2009	8:35 AM	Beaumont	Kroger	Dowlen	Panel truck	Parked	No	
6/30/2009	8:35 AM	Beaumont	Kroger	Dowlen	Semi-trailer	Parked	No	
6/30/2009	9:00 AM	Beaumont	Kroger	Dowlen	3 panel trucks (two from before)	Parked	Yes	Minimal
6/30/2009	9:15 AM	Beaumont	Kroger	Dowlen	2 panel trucks	Unloaded	Yes	Unknown
6/30/2009	9:18 AM	Beaumont	Kroger	Dowlen	Refrigerated panel truck	Parked at front of store and unloaded	Yes	12 min
6/30/2009	9:30 AM	Beaumont	Kroger	Dowlen	Panel truck	Docked	No	
6/30/2009	7:30 AM	Beaumont	Lowe's	Dowlen	semi-trailer and flatbed	Parked	No	
6/30/2009	9:45 AM	Beaumont	Lowe's	Dowlen	semi-trailer	Parked	No	
6/30/2009	5:30 PM	Houston	Best Buy	Old Katy Rd	None	No activity, sign says "No Idling Allowed"	No	
6/30/2009	7:00 PM	Houston	Best Buy	Old Katy Rd	None	No activity	No	
6/30/2009	6:20 PM	Houston	Home Depot	Katy Fwy	1 trailer, no tractor/truck attached	Docked, sign says "No overnight parking or idling, city ordinance"	No	
6/30/2009	7:30 PM	Houston	Home Depot	Katy Fwy	1 trailer, no tractor/truck attached	Docked	No	
7/1/2009	9:20 AM	Houston	Best Buy	Old Katy Rd	Semi-trailer with sleeper cab	Parked, driver not present (may be inside cab)	Yes	At least 20 min
7/1/2009	6:55 AM	Houston	HEB	Fry Road	semi-trailer	Docked	No	
7/1/2009	6:55 AM	Houston	HEB	Fry Road	2 small panel trucks	Parked	No	
7/1/2009	6:55 AM	Houston	HEB	Fry Road	14 wheeler panel truck	Parked	Yes	Less than 15 min
7/1/2009	7:25 AM	Houston	HEB	Fry Road	2 small panel trucks (one from before)	Parked	No	
7/1/2009	7:55 AM	Houston	HEB	Fry Road	Small panel truck (from before)	Parked	No	
7/1/2009	8:25 AM	Houston	HEB	Fry Road	None	None	No	

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Date	Observation Start Time	City	Store	Location	Truck Type	Activity	Idling	Duration
7/1/2009	8:55 AM	Houston	HEB	Fry Road	None	None	No	
7/1/2009	9:25 AM	Houston	HEB	Fry Road	2 semi-trailers	Parked	No	
7/1/2009	9:55 AM	Houston	HEB	Fry Road	3 semi-trailers (one from before)	Parked	No	
7/1/2009	9:55 AM	Houston	HEB	Fry Road	2 small panel trucks	Parked	No	
7/1/2009	9:30 AM	Houston	Home Depot	Fry Road	semi-trailer with sleeper cab	Parked, driver not present (may be inside cab)	Yes	At least 20 min
7/1/2009	9:30 AM	Houston	Home Depot	Fry Road	semi-trailer with sleeper cab	Parked	No	
7/1/2009	9:10 AM	Houston	Kohl's	Fry Road	2 trailers, no tractor/truck attached	Docked	No	
7/1/2009	7-8 AM	Houston	Kohl's	Fry Road	None	None	No	
7/1/2009	6:55 AM	Houston	Kroger	Fry Road	"Kroger" trailer, no tractor/truck attached	Docked	No	
7/1/2009	8:35 AM	Houston	Kroger	Fry Road	Large panel truck	Parked, unloading	Yes	25 min
7/1/2009	9:20 AM	Houston	Linens-n-Things	Fry Road	semi-trailer, flatbed with sleeper cab	Parked, driver not present (may be inside cab)	Yes	At least 20 min
7/1/2009	9:20 AM	Houston	Ross	Fry Road	semi-trailer with sleeper cab	Docked	No	
7/1/2009	9:20 AM	Houston	Ross	Fry Road	semi-trailer with sleeper cab	Parked	Yes	Unknown