

Air Pollutant Watch List Boundary Supplemental Documentation

Styrene in Lynchburg Ferry

Draft Developed May 2011

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Air Pollutant Watch List (APWL) Boundary Reevaluation

County: Harris

City: Houston

TCEQ Region: 12

APWL Site Number: APWL 1204

Pollutant: Styrene

Background

The Texas Commission on Environmental Quality (TCEQ) has set pollutant-specific air quality guideline levels known as air monitoring comparison values (AMCVs) to protect human health and welfare for various air contaminants, including styrene. Styrene is a colorless to slightly yellowish oily liquid with a sweet, sharp odor. Styrene is widely used for the manufacture of polystyrene, rubber resins, and insulators, and it is a common cross-linking agent in glass fiber-reinforced and unsaturated polyester resins.

Where ambient air monitoring indicates persistent concentrations above established AMCVs, the TCEQ establishes APWL areas. The purpose of the APWL is to reduce emissions by focusing TCEQ enforcement, permitting, pollution prevention, and monitoring resources and heightening awareness for interested parties in areas of concern. Ambient air monitoring data in Lynchburg Ferry demonstrates that no exceedances of the short-term health- or long-term health-based AMCVs occurred since the monitor was installed; however, multiple exceedances of the odor-based AMCV have been observed every year. In addition to the monitoring information, the Harris County Pollution Control Services Department has received numerous odor complaints over the years from citizens regarding the industrial facilities in the Lynchburg Ferry area.

Lynchburg Ferry was identified as an APWL area for benzene and styrene in 2002. The Lynchburg Ferry APWL area for benzene was delisted in 2010 due to significant and persistent reductions in benzene emissions and ambient monitoring levels below the established AMCVs. The maps and narratives for the two Lynchburg Ferry APWL areas, including the list of potential companies, are identical; however, most of the listed companies emit benzene, but do not handle or process styrene. To address this issue, TCEQ staff recommended reevaluation of the Lynchburg Ferry boundary for styrene. This will enable the TCEQ to more effectively focus its efforts on companies that emit styrene and potentially contribute to the elevated styrene levels at Lynchburg Ferry.

The TCEQ initially installed a monitor at the Lynchburg Ferry site in 2003 to better triangulate and identify sources of volatile organic compounds along the Houston Ship Channel. Monitoring data indicates that styrene levels have exceeded the TCEQ odor-based AMCV of 25 parts per billion by volume (ppbv) since monitoring began at this

location. The highest number of hourly styrene odor exceedances occurred in 2005, in which there were 92. This number steadily declined in the years 2006 through 2009, with 20 exceedances of the odor-based AMCV in 2009. In 2010, however, the number of styrene exceedances increased to 27.

All styrene concentrations monitored at the Lynchburg Ferry site were well below the short-term health- and long-term health-based AMCVs. The highest hourly concentration monitored at Lynchburg Ferry was 987 ppb_v, which is well below the short-term health-based AMCV of 5,100 ppb_v. Similarly, the highest annual average concentration was 1.7 ppb_v, which is well below the long-term health-based AMCV of 110 ppb_v. Therefore, monitored concentrations at Lynchburg Ferry do not have the potential to cause adverse health effects that may result from short- or long-term exposure to high concentrations of styrene, such as eye, nasal, and throat irritation, as well as central nervous system effects (additional information on the potential health effects of exposure to high styrene concentrations is available in the [TCEQ's styrene development support document](#)). The monitoring data at the Lynchburg Ferry site does, however, demonstrate that multiple exceedances of the styrene odor-based AMCV have occurred every year. The styrene concentrations that exceeded the odor-based AMCV of 25 ppb_v at Lynchburg Ferry have the potential to cause odor-related health effects, such as nausea and headaches.

The TCEQ has established a Work Group of TCEQ staff to reevaluate the Lynchburg Ferry APWL boundary. The Work Group conducted an evaluation to identify styrene sources that potentially contribute to the exceedances of the odor-based styrene AMCV at the Lynchburg Ferry monitor and recommends redefining the Lynchburg Ferry APWL boundary. The proposed boundary will enable the TCEQ to more effectively focus its resources to encourage styrene reductions. This will help ensure that styrene concentrations remain below the established AMCVs and are, therefore, protective of human health and welfare.

Evaluation

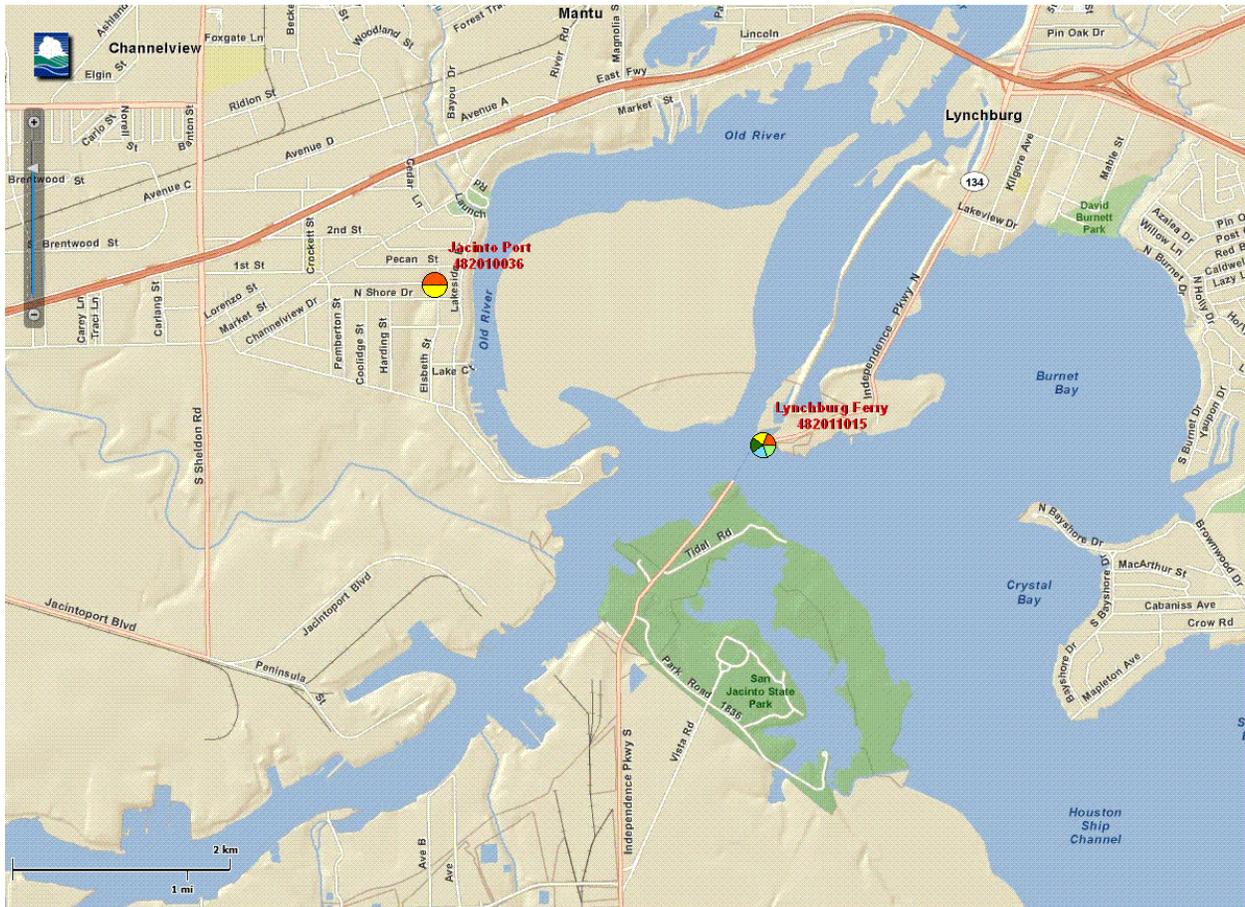
Ambient Air Monitoring Data

The TCEQ lists areas on the APWL based on routine and frequent evaluations of ambient air monitoring data. The TCEQ's Toxicology Division (TD) uses AMCVs to evaluate ambient air monitoring data in conducting health effects evaluations. An AMCV is a chemical-specific air concentration that is set to protect human health and welfare. The TD established an odor-based AMCV for styrene at 25 ppb_v, a short-term health-based AMCV of 5,100 ppb_v, and a long-term health-based AMCV of 110 ppb_v. No adverse effects would be expected if ambient air concentrations remain below these AMCVs.

The listing of the Lynchburg Ferry area on the APWL is based on data collected from the automated gas chromatograph monitor (auto GC) located at 1001 B Lynchburg Road. Figure 1, *Lynchburg Ferry Map*, provides a map of the Lynchburg Ferry area and the Lynchburg Ferry monitoring site (number 482011015). The map also shows the location

of the nearby Jacinto Port monitoring site in the Houston Ship Channel area. The monitoring sites are represented by colored circles. The different colors indicate the type of monitor located at each site. More information about these locations and monitors can be found using the [GeoTAM Viewer](#) on the TCEQ Web site.

Figure 1: Lynchburg Ferry Map



The auto GC monitor provides hourly average concentrations of styrene and approximately 40 other hydrocarbons, as well as meteorological and other data, on a continuous basis. The monitoring data demonstrates that no exceedances of the short-term health- or long-term health-based AMCVs occurred since the monitor was installed; however, multiple exceedances of the odor-based AMCV have been observed every year. The concentrations observed at the Lynchburg Ferry monitor have the potential to cause odor-related health effects, such as nausea and headaches. Table 1, *Number of Styrene Odor AMCV Exceedances per Year and Highest Hourly Styrene Concentration*, provides the number of exceedances and the highest hourly concentration of styrene for each year of the monitor's operation.

Table 1: Number of Styrene Odor AMCV Exceedances per Year and Highest Hourly Styrene Concentration

Year	Number of Exceedances	Highest Concentration (ppbv)
2003*	23	987
2004	57	258
2005	92	433
2006	52	358
2007	42	155
2008	32	494
2009	20	102
2010	27	265

* The Lynchburg Ferry monitor was activated on April 24, 2003; thus, this does not represent a full year of data.

Trend Analysis

The TD's health effects review of the 2009 ambient air monitoring network data, discussed later in this document, and the TCEQ's [2009 Annual Report on the Air Pollutant Watch List Areas in Texas](#) discuss the styrene emission trends at the Lynchburg Ferry monitor. The TCEQ previously noted in the 2009 annual APWL report that hourly styrene levels that exceed the odor-based AMCV have been reported at Lynchburg Ferry since monitoring began at the location in 2003 and that concentrations appeared to be on a downward trend since 2006. The report noted that significant reductions in the frequency of styrene exceedances were achieved, yet the maximum reported concentrations for 2008 had increased over those reported for 2005 through 2007. As such, the TCEQ recommended in the 2009 annual APWL report that further reductions are needed. In 2010, the number of styrene exceedances increased, as did the highest concentration of styrene. Therefore, the TCEQ continues to recommend styrene reductions in Lynchburg Ferry.

Health Effects Review of 2009 Ambient Air Network Monitoring Data in Region 12, Houston

The TD evaluated the 2009 ambient air network monitoring data, the findings of which are included in the [Region 12 health effects review memo dated March 9, 2011](#). This memo and previous [health effects reviews for Region 12](#) are located on the TCEQ's Web site. The TD used hourly styrene auto GC data and wind directional data collected at the Lynchburg Ferry monitor to determine that maximum concentrations for 2009 were from the north-northeast. The memo noted that results from the 2009 source

Figure 3: Pollution Rose - 2008 Maximum Styrene Concentrations

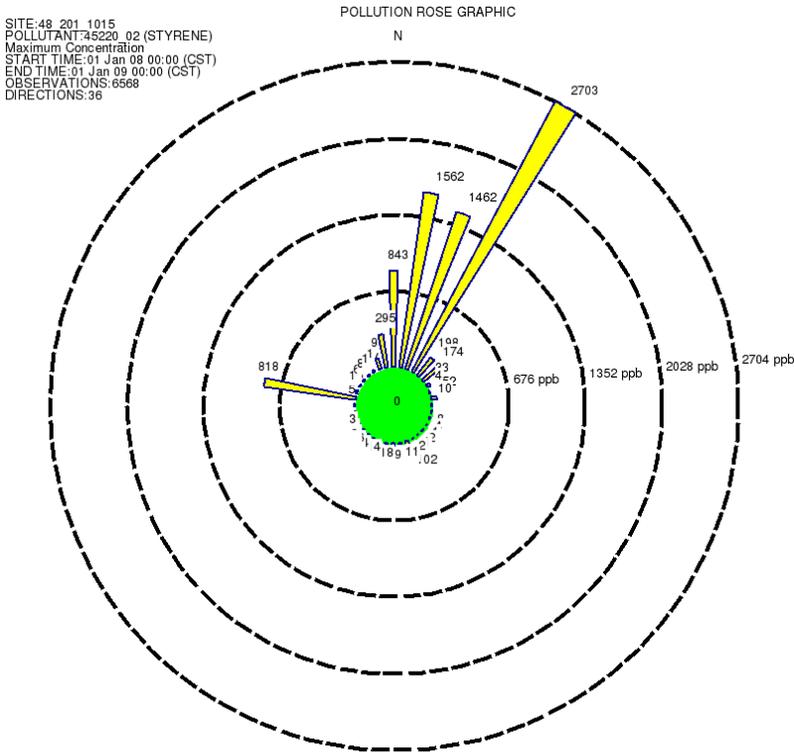


Figure 4: Wind Rose - 2008 Average Wind Direction

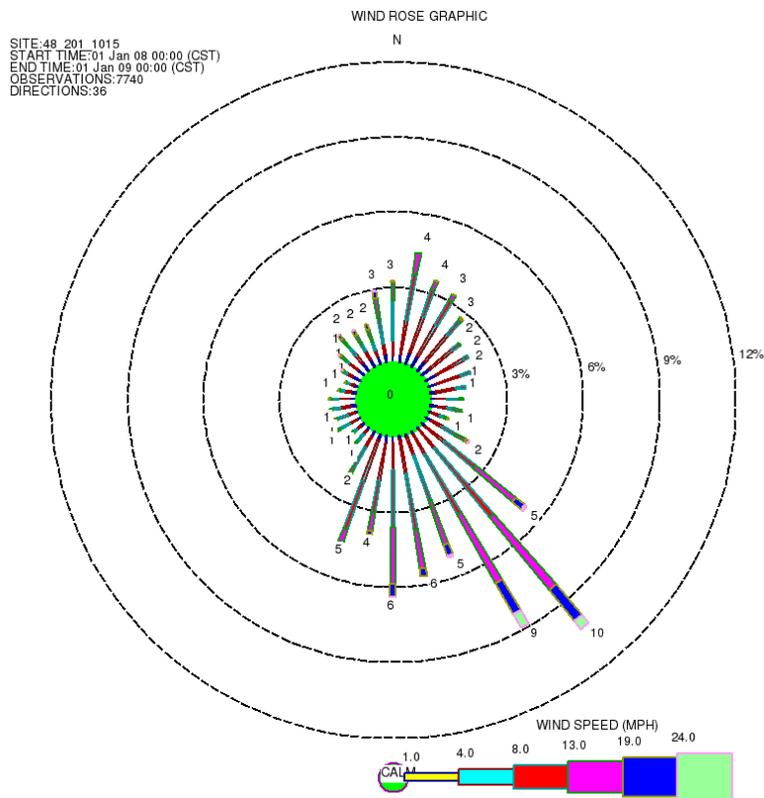


Figure 2 depicts the average styrene concentrations with respect to wind direction for the calendar year 2008. Figure 3 represents the maximum styrene concentrations measured from each of the 36 plotted wind directions for all data in 2008. Figure 4 is the annual average wind rose for 2008. The wind rose demonstrates that winds are predominantly from the south-southwesterly to southeasterly directions, with a secondary peak of instances of wind out of the north-northwesterly to northeasterly directions. Although the primary wind direction is from the south (Figure 4), styrene concentrations are primarily from the north-northeasterly direction. The average styrene concentrations are highest (34, 49, and 32 ppb_c, or approximately 4, 6, and 4 ppb_v, respectively) when the winds are out of the north-northeasterly to northeasterly directions, as is depicted in Figure 2. Figure 2 also shows an average concentration of 16 ppb_c (approximately 2ppb_v) from the west-northwesterly direction. Figure 3 demonstrates that the maximum styrene concentrations (1562, 1462, and 2703 ppb_c, or 195, 183, and 338 ppb_v, respectively) occur out of the north-northeasterly to northeasterly directions and also included a peak of 818 ppb_c (102 ppb_v) from the west-northwest. The data indicates that this is the only exceedance from the west-northwest out of 32 exceedances that occurred in 2008 and may be considered to be an outlier. The Work Group concluded from the annual pollution and wind rose data for 2003 through 2010 that the styrene emissions causing the exceedances of the odor-based AMCV predominantly originated from the north-northeasterly to northeasterly wind directions during light wind conditions. The primary contributing styrene sources are likely to be located relatively close to the monitor to the north-northeast to northeast.

Pollution and wind roses from the other years that the monitor was in operation also produced similar results. The highest concentrations were most frequently from the north to northeasterly directions, with some concentrations originating from other directions (or in some cases, with calm wind conditions) each year.

Pollution Rose Data for Individual Exceedances

Additionally, the Work Group developed pollution roses and evaluated the monitoring data for each individual styrene exceedance. These pollution roses demonstrate the direction of the origin of styrene at the time that the exceedances occurred. Examples of styrene pollution roses are provided in Figure 5, *Maximum Concentration Pollution Rose for November 6, 2010 (Styrene Exceedance at 1:00 a.m. Central Standard Time)*, Figure 6, *Maximum Concentration Pollution Rose for February 19, 2009 (Styrene Exceedances at 3:00 a.m. and 5:00 a.m. Central Standard Time)*, and Figure 7, *Maximum Concentration Pollution Rose for March 11, 2008 (Styrene Exceedances at 7:00 p.m., 8:00 p.m., and 10:00 p.m. Central Standard Time)*.

Figure 5: Maximum Concentration Pollution Rose for November 6, 2010 (Styrene Exceedance at 1:00 a.m. Central Standard Time)

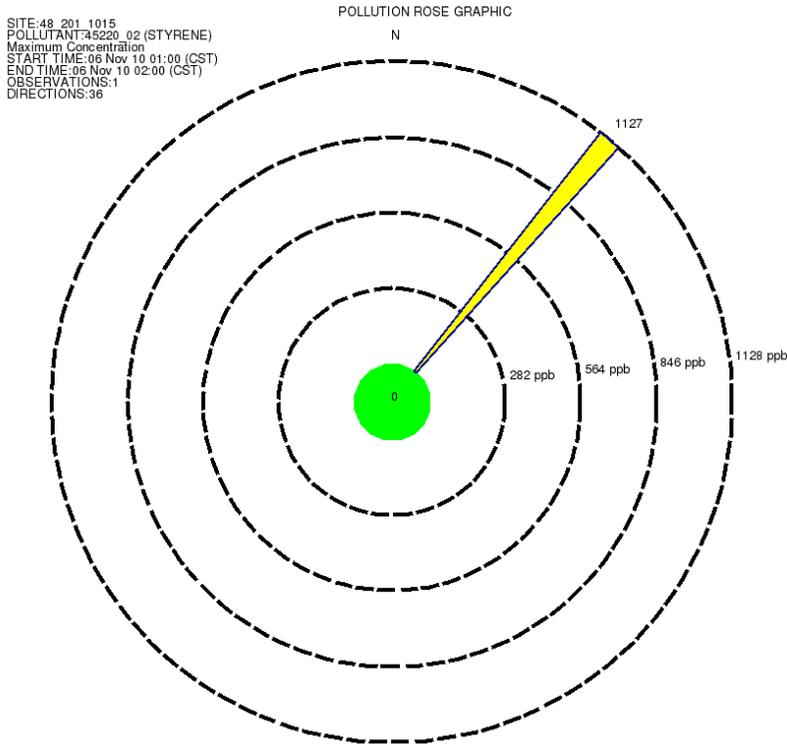


Figure 6: Maximum Concentration Pollution Rose for February 19, 2009 (Styrene Exceedances at 3:00 a.m. and 5:00 a.m. Central Standard Time)

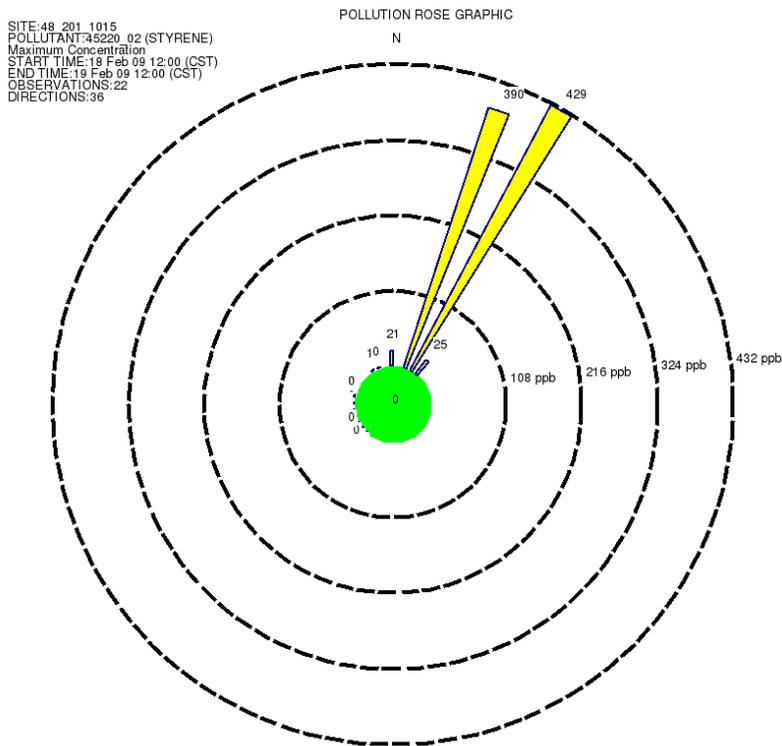
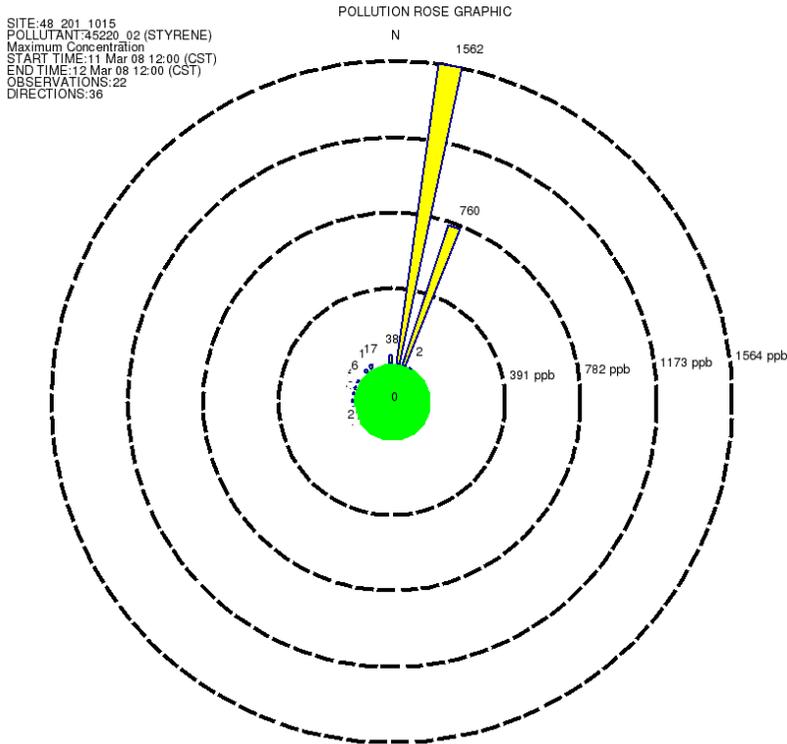
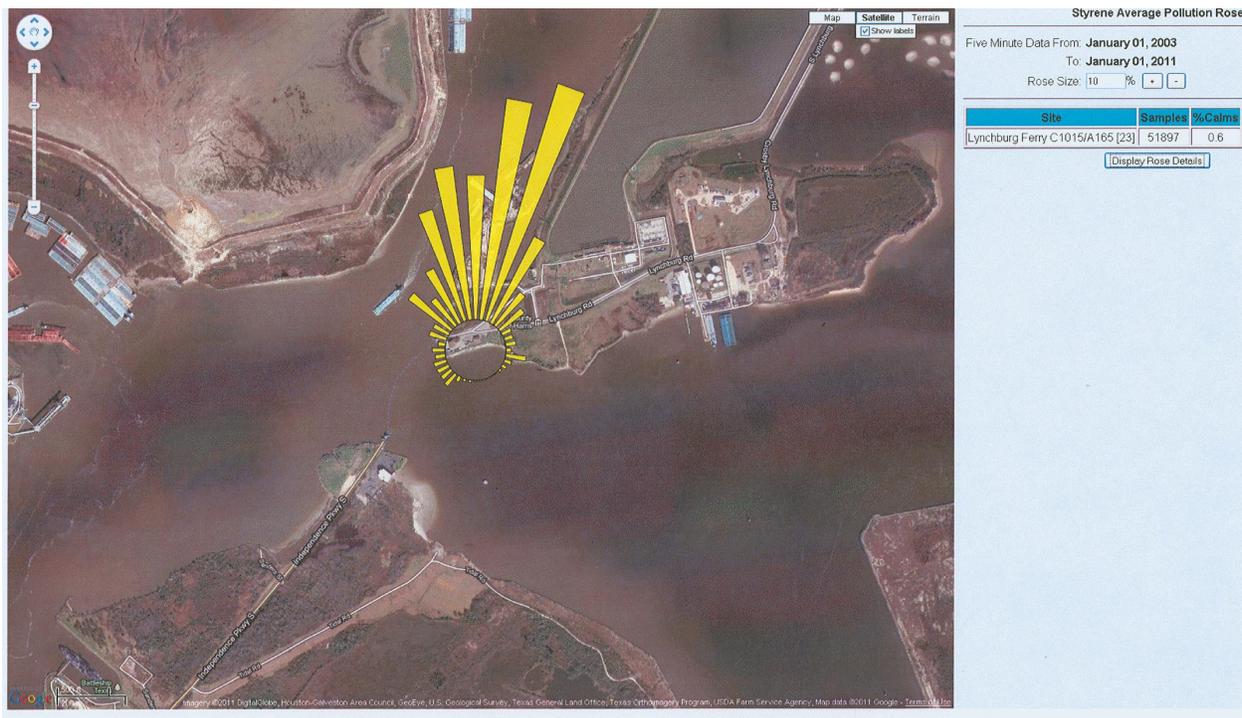


Figure 7: Maximum Concentration Pollution Rose for March 11, 2008 (Styrene Exceedances at 7:00 p.m., 8:00 p.m., and 10:00 p.m. Central Standard Time)



The evaluation of the pollution roses for the individual events points to probable contributing sources to the north to northeast of the monitor. Since 2003, the Lynchburg Ferry auto GC has monitored 345 hours that exceeded the odor-based AMCV. Of those exceedances, 92 percent of the exceedances originated from the northwesterly to northeasterly directions. Unfortunately, twelve exceedances occurred when no speed or wind direction could be obtained at the monitor. Seventeen of the hourly exceedances occurred during calm wind conditions or when the winds originated from the southwesterly, westerly, and southeasterly directions. For years 2006 to 2010, the pollution roses indicate that 80 percent of the occurrences originated from the north to northeasterly direction. Figure 8, *Average Styrene Pollution Rose 2003 through 2010 from the Lynchburg Ferry Monitoring Site*, represents the average styrene pollution rose from April 2003 through and including December 31, 2010.

Figure 8: Average Styrene Pollution Rose 2003 through 2010 from the Lynchburg Ferry Monitoring Site



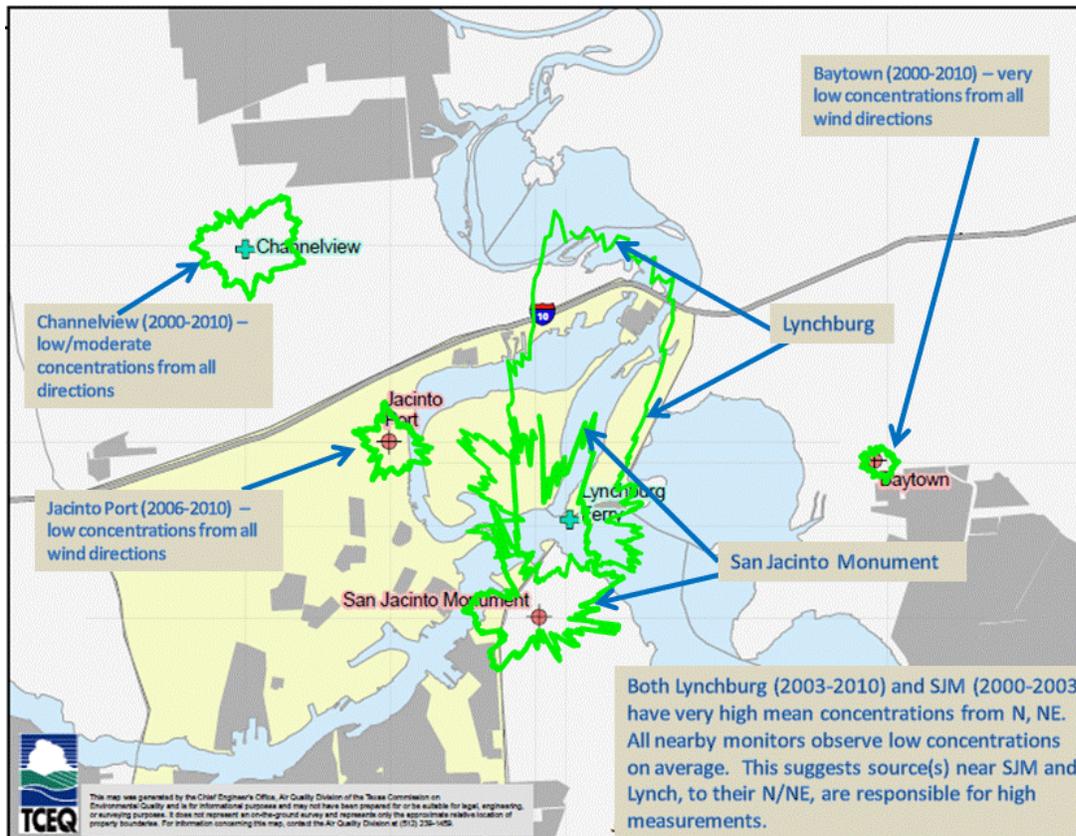
Canister Data Analysis

In addition to the Lynchburg Ferry auto GC monitoring data, the Work Group analyzed canister data. Canisters provide 24-hour average concentrations every sixth day. The Work Group evaluated canister data from the Lynchburg Ferry site and also evaluated canister data at nearby TCEQ monitors (Figure 9, *Mean Styrene Concentrations by Wind Direction*), including the Channelview monitor (located at 1405 Sheldon Road in Channelview), the Jacinto Port monitor (located at the corner of First and Elsbeth Streets in Channelview), and the Baytown monitor (located at 7210 1/2 Bayway Drive in Baytown). Monitoring data from the San Jacinto monitor was also evaluated. This monitor was located at 3824 1/2 Battleground in La Porte and was operational from April 17, 2000, to May 1, 2003.

The Work Group concluded that, relatively speaking, very low concentrations were monitored from all wind directions at the Baytown monitor from 2000 to 2010; low to moderate concentrations were monitored from all wind directions at the Channelview monitor from 2000 to 2010; and low concentrations were monitored from all wind directions at the Jacinto Port monitor from 2006 to 2010. Additionally, very high mean concentrations were monitored from the north and northeast at the Lynchburg Ferry monitor from 2003 to 2010 (which agrees with the auto GC findings, Figures 2 and 8) and at the San Jacinto Monitor from 2000 to 2003. Since all nearby monitors observed low concentrations on average, the data suggests that sources near the San Jacinto Monument and Lynchburg Ferry monitors are responsible for the high measurements. The Work Group developed a map depicting the mean styrene concentrations, as shown in Figure 9. The jagged lines around the monitors correspond to concentrations from particular wind directions; the distance from one point along the line to its respective

monitor represents magnitude of concentration, and the location of that one point represents direction of wind arriving at the monitor (the jagged line does not represent the distance of a potential source to the monitor). One can see that the Lynchburg Ferry canister measured its highest mean concentrations when winds were arriving from north to northeast.

Figure 9: Mean Styrene Concentrations by Wind Direction



Conclusions of Ambient Air Monitoring Data Analysis

The ambient air monitoring data discussed in this document and previous TCEQ determinations indicate that the likely sources of styrene contributing to exceedances at the Lynchburg Ferry monitor are located relatively close to the monitor to the north to northeast. The Work Group identified two nearby facilities as the most likely to produce emissions that would contribute to these exceedances. These facilities are Channel Shipyard, located at 999 Independence Parkway North in Baytown, and Southwest Shipyard, located at 18310 Market Street in Channelview. Both are located within two miles of the monitor, directly upwind from it when winds are from north to northeast (Figure 10, *2009 Average Styrene Concentrations*), and both perform barge degassing and cleaning operations, which are activities likely to result in styrene emissions.

Of these two, Channel Shipyard appears the most likely source, for two reasons. First, it is located very close—less than one-tenth of a mile—to the Lynchburg Ferry monitor. Southwest Shipyard is approximately 1.8 miles from the monitor. Channel Shipyard has reported greater styrene emissions than Southwest Shipyard (as discussed later in this

document in Table 3, *Tons of Styrene Emitted per Year*). Because of the distinctly greater emissions, which are released closer to the monitor, it is a logical conclusion that Channel Shipyard's emissions contribute more to high styrene concentrations measured at the Lynchburg Ferry monitor than Southwest Shipyard's emissions.

Second, unlike Lynchburg Ferry, the Jacinto Port monitor (Figure 9) is not measuring high concentrations from any direction, and it has no nearby sources. This suggests that the much higher concentrations measured at Lynchburg Ferry may be due to a source much closer to the Lynchburg Ferry monitor than to the Jacinto Port monitor.

A closer look at the Jacinto Port monitor's mean styrene concentrations (Figure 9) show that, while concentrations are relatively low compared to the surrounding monitors, they are not higher in the direction of Southwest Shipyard (northeast to east-northeast) than in the direction of Channel Shipyard (east to east-southeast). In fact, the opposite is true; they are somewhat greater (0.06 – 0.11 ppb_v) in the direction of Channel Shipyard than in the direction of Southwest Shipyard (0.06 – 0.07 ppb_v). It is, however, difficult to use Jacinto Port's styrene measurements to fully understand the relative amount of emissions of the two facilities because Southwest Shipyard is located farther (about 2.4 miles) from Jacinto Port than is Channel Shipyard (about 1.7 miles).

Figure 10 and Figure 11, *2009 Maximum Styrene Concentrations*, depict the average and maximum styrene pollution roses for 2009, respectively, on an aerial map of the Lynchburg Ferry area to demonstrate the likely sources of styrene emissions.

Figure 10: 2009 Average Styrene Concentrations

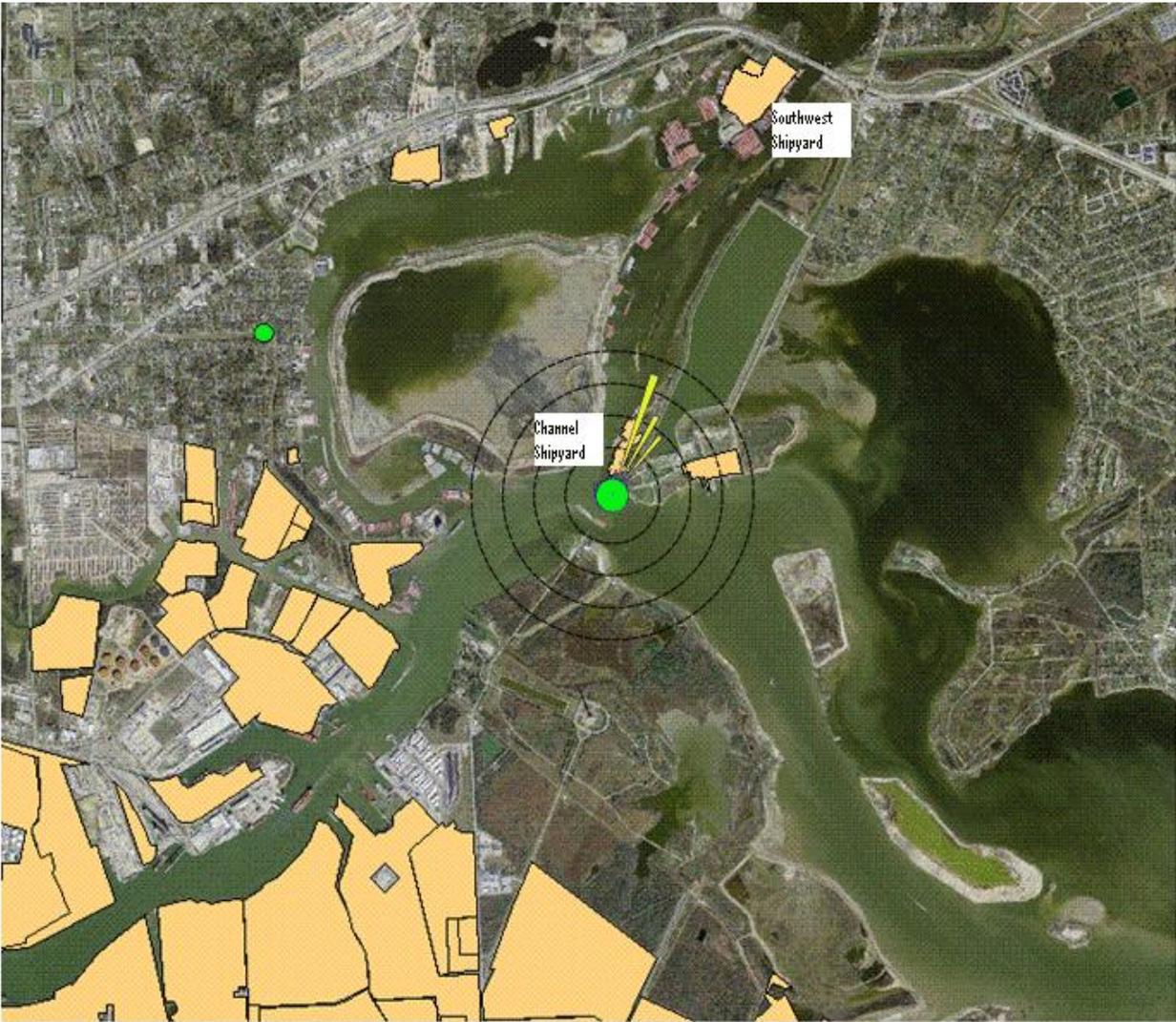


Figure 11: 2009 Maximum Styrene Concentrations



Three additional sites are located in the immediate area: Glendale Boat Works, located on Market Street, west of Southwest Shipyard; Kirby Inland Marine Operations Center, located on Market Street, south of Southwest Shipyard; and Houston Marine Services, located approximately one-third of a mile from the Lynchburg Ferry monitor to the east-northeasterly direction. The Kirby Inland Marine Operations Center was considered, but excluded, because it is primarily an office building, and its barge degassing and cleaning operations are located at a separate location. Similarly, Houston Marine Services was also excluded because it deals exclusively with heavy oils, greases, and lube oils and is not a potential source of styrene. In addition, Glendale Boat Works was excluded because it is not a potential source of styrene.

The Work Group did not identify any other potential stationary sources of styrene upwind of the monitor to the north to northeast during this evaluation; however, the Work Group identified several other styrene sources located in close proximity to the monitor. As discussed earlier in this evaluation, the majority of the styrene exceedances originated from the north to northeast, but a smaller percentage of the exceedances

(approximately eight percent since 2003 and 20 percent in the years 2006 to 2010) occurred from other wind directions or during calm conditions. The Work Group identified several styrene sources to the west to south-southwest that are located within two miles of the Lynchburg Ferry monitor and have the potential to impact the monitor. These sources have either reported styrene in their emissions inventories or are authorized to emit styrene and include: Vopak Terminal Deer Park; Vopak Logistics Services USA Deer Park; Kirby Inland Marine, LP; K-SOLV; Stolt Tank Cleaning Facility and Depot; Stolt Barge Services; Intercontinental Terminals Deer Park Terminal; Slay Transportation; and Johann Haltermann.

In addition to the stationary sources, marine vessels may also contribute to the styrene concentrations observed at the monitor. The Lynchburg Ferry monitor is located on the Houston Ship Channel; marine vessels, some of which transport styrene, frequently travel by the monitor or are idling in close proximity to the monitor. The TCEQ's Chief Engineer's Office is exploring approaches for addressing styrene emissions from marine vessels; however, the Lynchburg Ferry styrene boundary reevaluation demonstrates the need to better identify and obtain further styrene reductions from the stationary sources located near the monitor, as explained in this document. The redefinition of the Lynchburg Ferry APWL area will enable the TCEQ to better focus its efforts relating to styrene reductions for stationary sources.

Supplemental Data

Compliance History

The TCEQ rates the compliance history of every owner or operator that is regulated under the Texas Clean Air Act and other environmental laws. A compliance history is based on many factors, both positive and negative, relating to the entity's environmental performance at a site over the past five years. The TCEQ develops a numerical rating. A zero is the best rating, and the score increases with poorer compliance. The TCEQ classifies an entity as having a POOR, AVERAGE, or HIGH compliance history based on the numerical rating. An entity with a compliance history rating below 0.10 is classified as a HIGH performer, and the entity is considered to comply with environmental regulations extremely well. An entity with a rating of 0.10 to 45.00 is classified as AVERAGE and is considered to generally comply with environmental regulations. An entity with a rating of 45.01 or greater is classified as POOR and fails to comply with a significant portion of the relevant environmental regulations. If the TCEQ has no information on which to base a rating, the TCEQ assigns a rating of 3.01 and a classification of average by default (ABD). Compliance history ratings are assigned to regulated entities (the site that the TCEQ regulates) and customers (the individual or organization responsible for one or more regulated entities). For customers that are responsible for more than one regulated entity, the compliance history ratings for the regulated entity and the customer may be different for a particular site. More information regarding [compliance history](#) is located on the TCEQ Web site.

Table 2, *Compliance History Summary*, illustrates the compliance history classifications and ratings for the Lynchburg Ferry entities. The compliance history ratings and classifications in Table 2 were established on October 10, 2010.

Table 2: Compliance History Summary

Regulated Entity (RN) Name	RN Number	RN Rating	RN Class.	Customer (CN) Name	CN Number	CN Rating	CN Class.
Channel Shipyard	RN100218429	4.64	AVERAGE	Channel Shipyard Company, Inc.	CN600129662	4.64	AVERAGE
Southwest Shipyard	RN100248749	30.44	AVERAGE	Southwest Shipyard, LP	CN600135354	15.9	AVERAGE
Vopak Terminal Deer Park	RN100225093	10.9	AVERAGE	Vopak Terminal Deer Park, Inc.	CN601178734	10.9	AVERAGE
Vopak Logistics Services USA Deer Park	RN100223007	12.06	AVERAGE	Vopak Industrial Services USA, Inc.	CN600128391	12.06	AVERAGE
Kirby Inland Marine, LP	RN102204211	0.67	AVERAGE	Kirby Inland Marine, LP	CN600611206	1.95	AVERAGE
K-SOLV	RN100616721	7.29	AVERAGE	K-SOLV, LP	CN602495640	4.43	AVERAGE
Stolt Tank Cleaning Facility and Depot	RN102562063	0	HIGH	Stolt-Nielsen USA, Inc.	CN602524019	1.19	AVERAGE
Stolt Barge Services	RN104267133	0	HIGH	Stolt-Nielsen USA, Inc.	CN602524019	1.19	AVERAGE
Intercontinental Terminals Deer Park Terminal	RN100210806	5.15	AVERAGE	Intercontinental Terminals Company, LLC	CN603186495	4.08	AVERAGE
Glendale Boat Works	RN103038766	0	HIGH	Glendale Boat Works, Inc.	CN601568959	0	HIGH
Channel-view Asphalt Plant	RN100210483	12.38	AVERAGE	Pelican Refining Company, LLC	CN602983553	12.38	AVERAGE
Sneed Shipbuilding, Inc.	RN100867498	3.01	ABD	Sneed Shipbuilding, Inc.	CN600543938	2	AVERAGE
Solar Turbines	RN100214477	1.14	AVERAGE	Solar Turbines Incorporated	CN600127518	2.03	AVERAGE

Regulated Entity (RN) Name	RN Number	RN Rating	RN Class.	Customer (CN) Name	CN Number	CN Rating	CN Class.
DTX Oil Zavalla Road Facility	RN105052500	3.01	ABD	DTX Oil, LLC	CN603090945	3.01	AVERAGE
Flex Tank Systems Channel-view Facility	RN100542489	3	AVERAGE	Flex Tank Systems, LLC	CN600254064	3	AVERAGE
Trimac Transportation South	RN102525573	3.01	ABD	Trimac Transportation South, Inc.	CN600404628	6	AVERAGE
TM Deer Park Services	RN100209568	3.29	AVERAGE	Texas Molecular Limited Partnership	CN601546807	7.69	AVERAGE
DELTA USA	RN102574936	3.01	ABD	Delcor USA, Inc.	CN600379002	3.01	AVERAGE
Precoat Metals Division Sequa	RN100217926	4.93	AVERAGE	Sequa Corporation	CN600612618	2.76	AVERAGE
Powell Industries Offshore	RN100582352	3.01	ABD	Powell Industries, Inc.	CN601707722	3.01	AVERAGE
Houston Fuel Oil Terminal	RN100223445	0.78	AVERAGE	HFOTCO, LLC	CN603316548	2.07	AVERAGE
Slay Transportation	RN100558600	0	HIGH	Slay Transportation Co., Inc.	CN600269427	2	AVERAGE
Johann Haltermann	RN100219237	0.8	AVERAGE	Johann Haltermann, Ltd.	CN601181282	0.86	AVERAGE
Houston Fuel Oil Terminal West	RN102610912	1.21	AVERAGE	Johann Haltermann, Ltd.	CN601181282	0.86	AVERAGE
Duco Pipe Manufacturing Facility	RN102183647	0.09	HIGH	Duco, Inc.	CN602481996	0.09	HIGH
Techcote Industrial Coating, Ltd.	RN101078210	3.01	ABD	Techcote Industrial Coating, Ltd.	CN602988636	3.01	AVERAGE
GE AEP APS Houston Facility	RN100217959	0.5	AVERAGE	GE Packaged Power, Inc.	CN600129456	1.27	AVERAGE

Regulated Entity (RN) Name	RN Number	RN Rating	RN Class.	Customer (CN) Name	CN Number	CN Rating	CN Class.
Pace Services, LP	RN105449847	3.01	ABD	Pace Services, LP	CN 602578346	2.95	AVERAGE
Oil States Industries, Inc.	RN103886057	2.48	AVERAGE	Oil States Industries, Inc.	CN600356604	2.97	AVERAGE

Emissions Inventory

Title 30 Texas Administrative Code §101.10, Emissions Inventory Requirements, specifies that owners or operators of certain stationary sources are required to submit annual emissions inventories to the TCEQ that specify the company’s actual emissions over the previous reporting period. The Work Group used annual styrene emissions information to help identify which stationary sources emit styrene. Channel Shipyard and Southwest Shipyard, the two styrene sources to the north to northeast, have reported styrene in their emissions inventories.

Additionally, the following entities also reported styrene in past emissions inventories: Vopak Terminal Deer Park; Vopak Logistics Services USA Deer Park; Kirby Inland Marine, LP; Stolt Tank Cleaning Facility and Depot; and Intercontinental Terminals Deer Park Terminal. Table 3 contains the annual styrene emissions reported by the Lynchburg Ferry stationary sources. The other stationary sources either did not submit an emissions inventory (identified in Table 3 as “No EI”) or submitted an emissions inventory and did not report any styrene emissions (identified as “Styrene not reported”).

Table 3: Tons of Styrene Emitted per Year

Regulated Entity	2009	2008	2007	2006	2005	2004
Channel Shipyard	3.7935	4.2837	5.5874	6.0518	4.5771	2.2560
Southwest Shipyard	0.0004	0.0877	0.0522	0.0044	0.0060	0.0397
Vopak Terminal Deer Park	28.0687	32.5684	36.7185	27.103	31.3484	32.5216
Vopak Logistics Services USA Deer Park	0.4761	0.5938	0.3347	2.8988	0.6439	2.9241
Kirby Inland Marine, LP	0.0842	0	0.3833	0.7312	0.56	2.14

Regulated Entity	2009	2008	2007	2006	2005	2004
K-SOLV	No EI					
Stolt Tank Cleaning Facility and Depot	0.1424	0.3023	0.2809	0.1621	0.0134	Styrene not reported
Stolt Barge Services	No EI					
Intercontinental Terminals Deer Park Terminal	Styrene not reported	0.0152				
Glendale Boat Works	No EI					
Channelview Asphalt Plant	Styrene not reported					
Sneed Shipbuilding, Inc.	No EI					
Solar Turbines	Styrene not reported					
DTX Oil Zavalla Road Facility	No EI					
Flex Tank Systems Channelview Facility	Styrene not reported					
Trimac Transportation South	No EI					
TM Deer Park Services	Styrene not reported					
DELTA USA	Styrene not reported					
Precoat Metals Division Sequa	Styrene not reported					

Regulated Entity	2009	2008	2007	2006	2005	2004
Powell Industries Offshore	No EI					
Houston Fuel Oil Terminal	Styrene not reported					
Slay Transportation	No EI					
Johann Haltermann	0	0	0	0	0	0
Houston Fuel Oil Terminal West	Styrene not reported					
Duco Pipe Manufacturing Facility	No EI					
Techcote Industrial Coating, Ltd.	Styrene not reported					
GE AEP APS Houston Facility	Styrene not reported					
Pace Services, LP	No EI					
Oil States Industries, Inc.	No EI					

Designated Land Use and Proximity to Residential Areas and High-Traffic Roadways

Channel Shipyard and Southwest Shipyard are located on islands in the Houston Ship Channel. The area is industrial; however, some neighborhoods and a state park, the San Jacinto Battleground State Historic Site, are in close proximity. The TCEQ uses monitoring data from Lynchburg Ferry to ensure the protection of public health and welfare of those located at these nearby receptors.

Southwest Shipyard is located on Market Street, South of Interstate Highway 10 (IH-10), on an island that is located where the Old River and the San Jacinto River converge. Channel Shipyard is located on an island that is surrounded by Crystal Bay to the

southeast, Burnet Bay to the east, Lynchburg Reservoir to the northeast, San Jacinto River to the north and west, and the main portion of the Houston Ship Channel to the south and southwest. Southwest Shipyard's property line is less than one-tenth of a mile from IH-10.

Channel Shipyard is approximately one-tenth of a mile upwind of the Lynchburg Ferry monitor and approximately one-third of a mile upwind of the San Jacinto Battleground State Historic Site, which is located across the Houston Ship Channel on its south shore. Land use across the San Jacinto River from Southwest Shipyard includes residential neighborhoods. Some neighborhoods are within one-half of a mile of the shipyard. In addition, an unpopulated island used by the Houston Port Authority to deposit dredge material from the Houston Ship Channel is located southwest of Southwest Shipyard and northwest of Channel Shipyard.

Vopak Terminal Deer Park, Vopak Logistics Services USA Deer Park, Intercontinental Terminals Deer Park Terminal, Trimac Transportation South, and TM Deer Park Services are located south of the Houston Ship Channel. These sources are located to the southeast to south-southeast of the Lynchburg Ferry monitor and the state park. Vopak Terminal Deer Park and Vopak Logistics Services USA Deer Park are in the immediate vicinity and adjacent to the state park; however, all of these sources are within a mile of the park's boundary. These sources are otherwise surrounded by other industrial areas.

Channelview Asphalt Plant (Pelican Refining Company, LLC), Sneed Shipbuilding, Inc., and Pace Services, LP are located north of the Old River and south of IH-10, within one-tenth of a mile of the highway. The remainder of the sources are located east to southeast of the Lynchburg Ferry monitor, north of the Houston Ship Channel and east of Sheldon Road. The areas between these sources and Sneed Shipbuilding, Inc. include residences, as do the areas north of IH-10. Some of the residences are within one-fourth of a mile of industrial sources. These sources are otherwise surrounded by other industrial areas along the Houston Ship Channel.

Pollution Prevention Efforts

Channel Shipyard conducted a site-wide air dispersion modeling analysis as part of an application for a New Source Review air permit amendment. This analysis revealed that uncontrolled styrene barge degassing operations at Channel Shipyard could cause elevated off-site impacts. As a result, Channel Shipyard agreed to several operating conditions in its New Source Review permit, issued in 2009, to minimize the impact of styrene, including the installation of a vapor destruction unit at the site's north dock. Channel Shipyard has installed the vapor destruction unit and expects the new control device to be operational in the near future. Additionally, in 2011, Channel Shipyard began controlling all styrene emissions by performing all styrene barge degassing operations at its south dock, which currently has a control device. Channel Shipyard plans to continue this practice until the vapor destruction unit at the north dock is fully operational.

Boundary Definition

The Work Group is proposing to redefine the Lynchburg Ferry APWL boundary as follows:

South of IH-10

North of San Jacinto Boulevard and Old Battleground Road

West of Independence Parkway and S. Lynchburg Road/Crosby Lynchburg Road/Lynchburg Road

East of Sheldon Road and Tucker Bayou

This boundary will encompass a smaller geographical area than the Lynchburg Ferry boundary established in 2002. The proposed boundary will enable the TCEQ to focus its efforts on the stationary sources that are the most likely to contribute to the styrene exceedances at the Lynchburg Ferry monitor, such as Channel Shipyard, which the Work Group has determined is the primary contributor to the styrene exceedances recorded at the monitor. The boundary would also encompass Southwest Shipyard, which is located in the direction of a majority of the exceedances, though not identified by the Work Group as the primary contributor.

The boundary will also encompass other styrene sources located within two miles of the Lynchburg Ferry monitor, including the following: Vopak Terminal Deer Park; Vopak Logistics Services USA Deer Park; Kirby Inland Marine, LP; K-SOLV; Stolt Tank Cleaning Facility and Depot; Stolt Barge Services; Intercontinental Terminals Deer Park Terminal; Slay Transportation; and Johann Haltermann. These sources either reported styrene emissions in the emissions inventory or were previously identified by the TCEQ as being authorized to emit styrene.

In addition, the edges of the boundary will encompass other stationary sources. Some of the other sources may not emit styrene. The Work Group did not conduct an extensive file review for every source to verify whether each source is authorized to emit styrene.

The edges of the boundary are the closest manmade or geographical structures that will encompass the sources of concern. In addition, a narrative will be provided for the boundary, which includes a list of companies. Any company that is located within the edges of the boundary, in whole or in part, would be subject to the APWL program. This includes companies that are not explicitly listed in the narrative and also includes companies whose property is located on both sides of a boundary edge. For example, the TCEQ identified Old Battleground Road as one of the southern boundaries because it would allow the TCEQ to include sources of interest and because there are few defined roads in this heavily industrial area. A portion of Intercontinental Terminals Deer Park Terminal is located south of Old Battleground Road. Any portion of Intercontinental Terminals Deer Park Terminal would be subject to the APWL program, even those portions located south of Old Battleground Road.

As stated previously in this document, the purpose of the APWL is to reduce emissions by focusing TCEQ resources and heightening awareness to interested parties in areas of

concern. To better focus its resources, the Work Group proposes to identify the sources in the boundary narrative as Tier I, Tier II, and Tier III. The TCEQ is encouraging reductions from a source identified as Tier I. Tier II sources are the entities that the Work Group has identified as potential or actual styrene emitters. Tier III sources are located in the boundary and may not be potential sources of styrene. Table 4, *Lynchburg Ferry Sources According to Tier*, lists the sources in the proposed, redefined Lynchburg Ferry boundary narrative, according to their tier classification.

Table 4: Lynchburg Ferry Sources According to Tier

Classification	Regulated Entity	RN Number
Tier I	Channel Shipyard	RN100218429
Tier II	Southwest Shipyard	RN100248749
Tier II	Vopak Terminal Deer Park	RN100225093
Tier II	Vopak Logistics Services USA Deer Park	RN100223007
Tier II	Kirby Inland Marine, LP	RN102204211
Tier II	K-SOLV	RN100616721
Tier II	Stolt Tank Cleaning Facility and Depot	RN102562063
Tier II	Stolt Barge Services	RN104267133
Tier II	Intercontinental Terminals Deer Park Terminal	RN100210806
Tier II	Slay Transportation	RN100558600
Tier II	Johann Haltermann	RN100219237
Tier III	Glendale Boat Works	RN103038766
Tier III	Channelview Asphalt Plant	RN100210483
Tier III	Sneed Shipbuilding, Inc.	RN100867498
Tier III	Solar Turbines	RN100214477

Classification	Regulated Entity	RN Number
Tier III	DTX Oil Zavalla Road Facility	RN105052500
Tier III	Flex Tank Systems Channelview Facility	RN100542489
Tier III	Trimac Transportation South	RN102525573
Tier III	TM Deer Park Services	RN100209568
Tier III	DELTA USA	RN102574936
Tier III	Precoat Metals Division Sequa	RN100217926
Tier III	Powell Industries Offshore	RN100582352
Tier III	Houston Fuel Oil Terminal	RN100223445
Tier III	Houston Fuel Oil Terminal West	RN102610912
Tier III	Duco Pipe Manufacturing Facility	RN102183647
Tier III	Techcote Industrial Coating, Ltd.	RN101078210
Tier III	GE AEP APS Houston Facility	RN100217959
Tier III	Pace Services, LP	RN105449847
Tier III	Oil States Industries, Inc.	RN103886057

The tiered structure will enable the TCEQ to better focus its resources. For example, the TCEQ has identified the Tier I source. The TCEQ will work with the Tier I source and encourage styrene reductions. The TCEQ will be able to closely track the other known potential styrene sources, classified as Tier II. The TCEQ will use the APWL as a tool to identify possible styrene increases in the future and determine whether or not a more

enhanced review is warranted. The TCEQ will also be able to track any possible activity from the Tier III sources, which were not necessarily identified as potential styrene emitters. In addition, the tiered structure will help the TCEQ focus other efforts, such as pollution prevention efforts and inspections. The tiered structure would also enable members of the public to have a better understanding of the primary sources that can emit styrene in the Lynchburg Ferry area and which sources may be more likely to contribute to the styrene exceedances at the Lynchburg Ferry monitor. Figure 12, *Proposed Lynchburg Ferry Area*, is a map of the proposed Lynchburg Ferry APWL area.

Figure 12: Proposed Lynchburg Ferry Area



Public Comment Period

The TCEQ will accept comments on the Lynchburg Ferry APWL boundary. Interested persons may send comments to APWL@tceq.texas.gov or may send comments to the APWL coordinator at the following mailing address:

Ms. Tara Capobianco, P.E.
Air Pollutant Watch List Coordinator
Texas Commission on Environmental Quality
Chief Engineer's Office
MC-168
P.O. Box 13087
Austin, Texas 78711-3087

The TCEQ will accept comments through December 23, 2011. Any questions regarding the proposed boundary or the APWL process may be forwarded to Ms. Capobianco at (512) 239-1117.

Public Meeting

The TCEQ will conduct a public meeting to receive comments on the boundary proposal. The public meeting will be held on December 14, 2011, at the North Channel Branch Library, located at 15741 Wallisville Road, Houston, Texas 77049.

The TCEQ will give a short presentation at 6:00 p.m. After a short question and answer session, the TCEQ will officially open the public meeting. The public meeting will be structured for the receipt of oral or written comments by interested persons. Individuals may present statements when called upon in order of registration. Open discussion within the audience will not occur during the public meeting; however the TCEQ staff will be available to discuss the proposed boundary and answer any additional questions after the meeting.

Persons who have special communication or other accommodation needs who are planning to attend the meeting should contact Ms. Capobianco as far in advance as possible.